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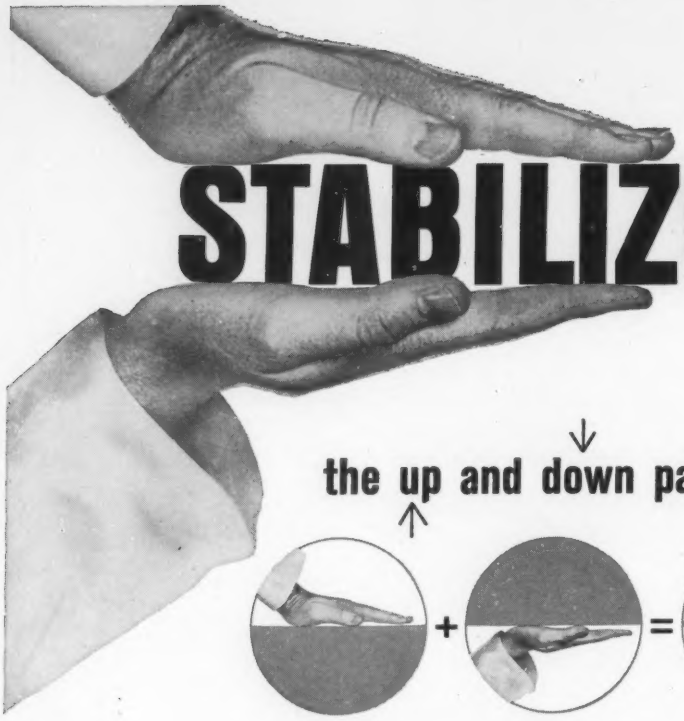

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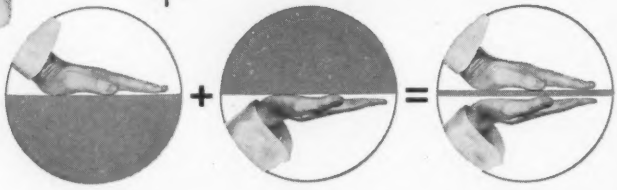

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1. Arnoff, B.: Personal communication. 2. Lazarte, J. A., and Petersen, M.C.: Personal communication.

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MILITARY MEDICINE

ORIGINAL ARTICLES

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Studies on Schistosomiasis. XI. Some Ointments Examined for Protection Against *Schistosoma Mansoni* Cercariae in Preliminary Tests*

By

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SCHISTOSOMIASIS is a well recognized, widespread disease affecting many millions of people throughout the world. Under ordinary conditions the control of schistosomiasis would involve destruction of the snail intermediate host, treatment of infected persons and of human feces before it is used for fertilizer, education of people living in endemic areas, and other protective measures.

Most of these control measures are not practical for use by the military; hence the search for effective individual protective measures. From the military viewpoint two possibilities appear to be practical: (1) the use of protective clothing and, (2) an ointment to protect the exposed skin. Thirty years ago Faust and Meleney (1924) reported that cloth was known to act as a barrier against *Schistosoma japonicum*. Since 1945, numerous workers have studied the effectiveness of impregnated and unimpregnated clothing (Hill, 1945; Ferguson *et al*, 1946; Nolan, Mann, and Churchill, 1947; Wright, Bauman, and Fry, 1948a; and Hunter, *et al*, 1949).

Bang, *et al* (1945) and Wright, Bauman, and Fry (1948b) investigated the usefulness of ointments as a means of protecting the skin and Küntz, Stirewalt, *et al* (1947) tested other ointments and fabrics for their ability to keep schistosome cercariae from infecting mammals. In 1947 Atkins suggested on theoretical grounds that some copper compounds might protect the exposed skin against the penetration of schistosome cercariae.

In the meantime copper oleate was under test (Kaufman, Hunter and Pan 1949). By 1952 Ritchie, *et al* had tested two ointments and Hunter, Kaufman, and Pan had demonstrated that copper oleate protected mice against the penetration of *Schistosoma japonicum* cercariae. Subsequently, Hunter, Ritchie, *et al* (1952) attempted to protect persons sensitized to cercariae of the dermatitis-producing bird schistosome, *Gigantobilharzia sturniae* Tanabe. Six compounds were tested. Of these, copper oleate alone gave complete protection to paddy workers for six hours. This compound was tested in the United States as a possible means of

* This investigation was supported in part by the Medical Research and Development Board, Office of The Surgeon General, Department of The Army, under Contract No. DA-49-007-MD-468.

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protection against the cercariae of *S. mansoni* (Moon and Hunter, 1954, 1955). Unfortunately copper oleate did not provide complete protection to mice when tested against this parasite. This failure of copper oleate led to more extensive tests (Radke, Hunter, *et al*, 1953, 1954) which have culminated in a large scale screening program of potential protective ointments (Kemp, *et al* 1954). This program is being carried out under the sponsorship of the Commission on Parasitic Diseases, Armed Forces Epidemiological Board, being supported in part by The Office of the Surgeon General, D. A.

Materials and Methods

Preparation of Ointments. Ointments used in this study were prepared either by chemical or mechanical means. Chemically, the active ingredient was dissolved in an appropriate solvent and incorporated in the melted base by agitation. After agitation, the solvent was driven off by heat.

In cases where solvents were not found, the active ingredients were ground in a mortar and incorporated mechanically into an ointment vehicle. Olive oil, Tween 80, and paraffin were added to improve the consistency of the ointment. Ointment vehicles and supplemental agents were tested for cercaricidal properties but none was found to protect mice (Radke, Hunter, *et al* 1953, 1954). The ointments were applied by inunction or by cotton swab.

Snails. For the purposes of this experiment a colony of snails, *Australorbis glabratus,* infected with *Schistosoma mansoni* was established and maintained in aquaria in this laboratory.*

Cercariae. Livers of mice infected with *S. mansoni* were minced and washed several times in chlorine-free water to release the schistosome eggs from tissue. The material thus obtained was placed in a flask under artificial light and heated until the eggs hatched and free swimming miracidia were observed. These were harvested, pooled, and transferred in lots of 10 each to sputum cups containing a single uninfected *A. glabratus* in about 5 ml. of chlorine-free water. After 12 hours the snails were returned to the aquarium. They were checked for cercariae at the end of 4 to 6 weeks.

Known positive snails infected at different times were selected in order to obtain both male and female cercariae for experimental use. These positive snails were placed in a single beaker under artificial light. After emergence, the cercariae were pipetted to petri dishes under dissecting microscopes and transferred by means of a micropipette in lots of 100 as needed.

In Vivo Experiments. White mice were prepared for exposure to the cercariae of *S. mansoni* according to the methods of Pan, Kaufman, and Hunter (1951), except that both the control and test mice were belly-shaved rather than back-shaved. Specially designed plastic infection boards, with a well in the center, were used.†

Test and control mice were taped ventral side down over the wells in the infecting boards. One hundred cercariae of *S. mansoni* were introduced into the wells along with sufficient aerated water to contact the belly of each mouse. Control mice were always exposed simultaneously with the ointment "protected" mice to the same number as well as the same pools of cercariae.

After a 30 minute exposure period all wells were drained and all mice removed and placed in cages. The water from the well of each control infecting board was examined microscopically and the remaining cercariae and cercarial bodies were counted and recorded.

Six weeks after exposure to the cercariae of *S. mansoni,* both the "protected" (ointment-treated) and control mice were perfused according to the method outlined below.

Method of Perfusing Mice. Basically the perfusion technique consists of a simplifica-

* The original stock was secured through the courtesy of Dr. D. V. Moore and Dr. H. E. Meleney, formerly of New York University Medical School.

† Plastic boards were designed with the assistance of Sgt. Joseph S. Williams and Lt. A. P. Moon, MSC.

tion of Pan and Hunter's (1951) modification of the original perfusion method of Yolles, Moore *et al* (1947). The steps in the technique as revised are as follows:

1. Connect a 100 ml. syringe to the stem of a "T" tube. Connect one arm to an aspirating bottle (with a stopcock) containing physiological saline. Connect the needle to the other. Use a 22 gauge needle for mice and a 19 gauge needle for hamsters.

2. Open the stopcock to fill the syringe and then close it to prevent back flow.

3. Anesthetize the animal with ether, open the abdominal cavity and ligate the following: (a) inferior vena cava close to the heart; (b) an inclusive ligature above the heart to include the esophagus, trachea, aortic arch and superior vena cava to the spinal column; (c) an inclusive ligature just cephalad to the bifurcation of the iliac artery to include the dorsal aorta, ureters, and descending colon.

4. After the ligatures are completed the spine is cut above the most cephalad ligature and below the caudad ligature.

5. The viscera are then separated from the body and, along with the backbone, placed in a petri dish.

6. The hepatic portal vein is cut just before it enters the liver. A hypodermic needle is then inserted into the aorta and saline is forced through the mesenteric circulation, freeing the worms and ejecting them through the hepatic portal vein. Ligation of the hepatic portal vein (Pan and Hunter, 1951) was not done since the liver drains when the portal vein is severed.

7. The needle is then inserted into the hepatic sinus and the liver is flushed free of worms.

8. The liver is then removed and minced thoroughly to detect any worms which may have been missed.

The original protocol for these experiments included the following procedures:

1. The initial Preliminary Screening Test which consisted of exposing 15 "protected" (ointment-treated) and 10 control mice to 100 cercariae each of *S. mansoni* for 30 minutes.

2. If all "protected" mice were negative for *S. mansoni* at autopsy six weeks later, the test was repeated thus bringing the total numer of mice "protected" by this ointment to 25 or more.

In Vitro Experiments. Certain *in vitro* tests were planned in which both the ointments and their consituent parts were to be tested. These consisted of "contact" and "diffusion" tests. Contact tests were carried out in two sections: 1 *Immediate Contact Tests* to determine whether ointments had an immediate toxic effect upon cercariae, due to either direct contact or rapid diffusion of the toxic agent into the water. 2 *Delayed Contact Tests* to determine whether ointments would retain their efficacy after contact with water for 24 hours.

Diffusion Tests were also run to determine whether the active principle of the ointments used would diffuse into water in sufficient concentration to kill the cercariae of *S. mansoni* at the end of 4 and 72 hours. The results of these tests will appear in the final report.

Results

In Vivo Tests. General. A total of 134 Preliminary Screening Tests have been completed. These are reported here (Tables I, II).

Preliminary Screening Tests. Eighty-five preparations provided 90-100 "Per Cent Relative Protection" to white mice against the cercariae of *S. mansoni* (Table I).* Forty-six of these furnished 100 "Per Cent Relative Protection," the remaining 39 providing over 90 "Per Cent Relative Protection." Table II lists 49 ointments which provided less than 90 "Per Cent Relative Protection" against the cercariae of *S. mansoni.*

Discussion

The object of these Preliminary Screening Tests was to select the most promising cercaricidal ointments. It is recognized that these are not altogther definitive tests since it might be possible for the diffusion of test

* See [5] in footnotes in Table I for an explanation of "Per Cent Relative Protection."

TABLE I. SUMMARY OF PRELIMINARY SCREENING TESTS OF OINTMENTS PROVIDING 90–100 PER CENT RELATIVE PROTECTION FOR 30 MINUTES AGAINST 100 CERCARIAE OF *Schistosoma Mansoni*[1]

Group I. Insecticides and Per Cent Active Ingredient[2]	Ratio of Mice Protected (Autopsy)[3]	Number of Infected Control Mice (Autopsy)[4]	Relative Per Cent Protection[5]
1. Actamer (5); Petrolatum; Olive Oil	31/32/39	16	99.9
2. Aramite 15W (5); Petrolatum; Olive Oil	25/25/35	18	100
3. Captan (5); Petrolatum; Olive Oil	26/26/31	20	100
4. Dichlorophene (10); Petrolatum; Olive Oil	30/30/47	21	100
5. Hexachlorophene (10); Petrolatum; Olive Oil	15/15/50	14	100
6. Lindane (3); Petrolatum; Olive Oil	9/13/16	12	99.0
7. Lindane (1); Petrolatum; Olive Oil	2/ 5/12	5	94.4
8. Lindane (1); Dieldrin (1); Petrolatum; Olive Oil	3/ 8/15	10	96.9
9. N-244 (5); Petrolatum; Olive Oil	10/11/15	6	99.4
10. Spergon (5); Petrolatum; Olive Oil	13/13/14	8	100
11. Sulphenone (5); Petrolatum; Olive Oil	31/32/35	22	99.9
12. Thanite (5); Petrolatum	11/12/15	7	99.6
13. Thanite (1); Petrolatum	12/12/15	6	100
Group II. Repellents and Per Cent Active Ingredients[2]	**Ratio of Mice Protected (Autopsy)[3]**	**Number of Infected Control Mice (Autopsy)[4]**	**Relative Per Cent Protection[5]**
14. Benzyl Benzoate (26.5); Aqueous	13/13/13	9	100
15. Benzyl Benzoate (21.5); Olive Oil (69.5); Santocel (10)	13/13/15	9	100
16. Covicone with Repellents (—)	47/47/60	34	100
17. Dibutyl Phthalate (10); Petrolatum	5/ 5/15	8	100
18. Dibutyl Phthalate (5); Rutgers 612 (5); Petrolatum	9/10/15	8	99.8
19. Diethyl Phthalate (10); Petrolatum	16/16/16	7	100
20. Dimethyl Phthalate (10); Petrolatum	27/27/33	17	100
21. Dimethyl Phthalate (5); Indalone (5); Petrolatum	13/13/15	9	100
22. Dimethyl Phthalate (5); Indalone (5); Rutgers 612 (5); Petrolatum	12/12/15	11	100
23. Dimethyl Phthalate (6); Indalone (2); Rutgers 612 (2); Petrolatum	14/14/15	11	100
24. Dimethyl Phthalate (6); Indalone (2); Rutgers 612 (2); Silicote	11/11/15	6	100
25. Diphenyl Phthalate (10); Petrolatum	12/12/14	10	100
26. Indalone (10); Petrolatum	26/26/29	18	100

[1] Usually a minimum of 15 "protected" mice were exposed along with 10 controls. Additional lots were exposed in some instances.

[2] The per cent of the active ingredient by weight appears in parenthesis; a dash indicates this is unknown.

[3] This is expressed in a "fraction" as 10/12/14; i.e., 10 of 12 mice surviving to autopsy were negative for *S. mansoni*, the last figure (14) means that a total of 14 were exposed, but the difference (2) died before autopsy.

[4] In some instances less than 10 control mice survived to autopsy. However, all control mice posted were positive for adults of *S. mansoni*.

[5] Relative per cent protection indicates the *degree of infection* in the "protected" mice. The relative per cent protection is calculated as follows: Where the average number of worms recovered per control mouse is "x," the average number of worms per "protected" mouse is "y" and the per cent relative protection is "z." Then, $z = (x-y)/x$. Example: $x = 45$, $y = 35$, $z = (45-35)/45 = 22.2\%$ relative protection.

TABLE I—(*continued*)

27. Indalone (10); Copper Oleate (90)	15/15/15	6	100
28. Indalone (5); Rutgers 612 (5); Petrolatum	11/11/15	9	100
29. N-Butyl Acetanilide (5); Petrolatum	16/16/19	8	100
30. N-Butyl Acetanilide in Isopropane (5); Petrolatum	14/14/15	10	100
31. Rutgers 612 (10); Petrolatum	9/14/15	10	93.4
Group III. Protoplasmic Poisons and Per Cent Active Ingredients[2]	**Ratio of Mice Protected (Autopsy)[3]**	**Number of Infected Control Mice (Autopsy)[4]**	**Relative Per Cent Protection[5]**
A. *Bactericides*			
32. Amertan (—)	17/18/28	23	99.5
33. Arquad C(5); Petrolatum	10/10/13	7	100
34. Arquad S(5); Petrolatum	6/ 6/16	7	100
35. Arquad T(5); Petrolatum	4/ 4/15	8	100
36. Arquad 2C(5); Petrolatum	11/11/15	7	100
37. Arquad 18(5); Petrolatum	15/15/15	7	100
38. Hyamine (5); Petrolatum	2/ 2/13	7	100
B. *Fungicides*			
39. Desenex (—)	22/22/30	15	100
40. Ethyl Vanillate (1.5); Olive Oil; Petrolatum	19/22/27	15	99.6
41. N-Propyl Vanillate (3); Olive Oil; Petrolatum	12/12/16	5	100
42. Penathol (15); Petrolatum	10/11/15	8	99.6
43. Salicylic Acid (10); Petrolatum	12/14/14	9	99.3
C. *Molluscocides*			
44. Santobrite (0.5); Petrolatum Olive Oil	11/11/14	8	100
D. *Piscicides*			
45. Protex (0.5); Petrolatum; Olive Oil	10/10/15	6	100
46. Quillaja Bark Extract (10); Petrolatum; Olive Oil	10/11/15	7	99.3
47. Rotenone (5); Petrolatum	5/ 6/15	6	98.4
48. Saponin, Crude (10); Petrolatum; Olive Oil	9/11/16	6	98.4
49. Saponine, S/V 300 (10); Petrolatum; Olive Oil	10/12/15	9	99.6
50. Saponin, Tech. (10); Petrolatum; Olive Oil	8/12/14	9	99.0
51. Yucca Leaf Powder (10); Petrolatum; Olive Oil	14/14/30	12	100
E. *Spermicides*			
52. Ortho-Gynol (—)	13/13/20	14	100
53. Preceptin (—)	15/15/15	7	100
F. *Vermicides*			
54. Caricide (5); Petrolatum; Olive Oil	5/11/15	7	94.1
55. Fuadin (20); Petrolatum	4/12/15	6	92.5
Group IV. Commercial Bases and Per Cent Active Ingredient[2]	**Ratio of Mice Protected (Autopsy)[3]**	**Number of Infected Control Mice (Autopsy)[4]**	**Relative Per Cent Protection[5]**
56. Aerolube (—)	12/12/14	10	100
57. Kerodex 51 (—)	8/ 8/15	10	100
58. Kolpix A (—)	6/10/14	6	98.3
59. Kolpix D (—)	10/11/16	6	99.6
60. Ply-9-Gel (—) (10 Appls.)	13/13/15	9	100
61. Ply-9-Gel (—) (1 Appl.)	9/13/15	10	93.9
62. Ply-3 (—)	2/13/15	7	93.3
63. Prantal (—)	4/12/15	6	94.5

TABLE I—(*continued*)

64. Proderna (—)	5/12/14	6	96.1
65. Silicate (—)	2/14/16	7	90.8
66. ZAC (—)	13/13/15	6	100
Group V. Miscellaneous and Per Cent Active Ingredient[2]	Ratio of Mice Protected (Autopsy)[3]	Number of Infected Control Mice (Autopsy)[4]	Relative Per Cent Protection[5]
67. BAL (—)	16/16/30	14	100
68. Barium Ricinoleate (10) Petrolatum	6/12/15	10	97.3
69. Copper Arsenate Sodium Polyphosphate (5); Petrolatum; Olive Oil	3/12/14	7	96.9
70. Copper Bentonite (5); Olive Oil; Petrolatum	4/13/15	9	97.0
71. Copper-O-Chlorobenzoate (5); Petrolatum; Olive Oil	8/15/15	10	98.37
72. Copper Oleate (50); Ether	12/20/29	10	98.4
73. Copper Oleate (20); Petrolatum	9/13/15	10	98.4
74. Copper N,N[1] Dibutyl Ethylene Diamine Complex, Sodium Pentachlorophenate Reaction Product MB 792 (5); Petrolatum; Olive Oil	12/12/15	7	100
75. Copper (II) 5-Chlorosalicyl-P-Chloranilide (5); Petrolatum; Olive Oil	13/13/15	6	100
76. Copper-2-Benzyl Thiazolyl Oxide (5); Petrolatum; Olive Oil	11/14/15	6	99.1
77. Copper-8-Quinolinolate (5); Petrolatum; Olive Oil	15/15/15	4	100
78. M-5 (—)	1/ 6/15	9	97.6
79. Oleic Acid (10); Petrolatum	1/ 8/14	9	90.1
80. P-Chlorobenzenethiol (5); Petrolatum; Olive Oil	4/ 8/15	8	98.5
81. Urea Stibamine (5); Olive Oil; Petrolatum	2/13/15	8	90.7
82. 1,2,3,4 Tetrachlorobenzene (5); Petrolatum; Olive Oil	7/14/16	10	97.4
83. 640 C (3.3); Petrolatum; Olive Oil	11/11/15	5	100
84. 642 C (3.3); Petrolatum; Olive Oil	12/12/15	7	100
85. 786 C (3.3); Petrolatum; Olive Oil	11/11/15	5	100

material into the water to reach a concentration sufficient to immobilize the cercariae and so prevent them from penetrating the skin of the mouse, thus producing falsely positive results. Whatever the odds in that regard, the test eliminates completely or partially ineffective ointments from further study.

It should also be made clear that the "Per Cent Relative Protection" factor is not to be taken literally to mean that if "X" ointment is 92 per cent effective, it is therefore only 8 per cent short of affording perfect protection. Or, if "Y" ointment's Relative Protection factor was found to be 96, it is 4 per cent more effective than "X." Indeed, 100 "Per Cent Relative Protection" itself only means *relatively* 100 per cent under the test circumstances, not necessarily perfect protection under other test conditions. Moreover, it should go without saying that definitive conclusions percentage-wise can not be drawn from results where such small numbers of test animals are used. Protection and survival in these experiments, then, can have a meaning subject only to loose interpretation and are valuable only as a means of screening out, that is, separating from the widely chosen list of items tested, those that have promise from those that have little cercaricidal effect under the conditions of this test. To carry the proposition a step farther, only those items which afforded 100 "Per Cent Relative Protection" should be deemed worthy of further and more definitive testing, so large are the interstices of this screen.

TABLE II. OINTMENTS AFFORDING LESS THAN 90 PER CENT RELATIVE PROTECTION IN PRELIMINARY SCREENING TESTS AGAINST 100 CERCARIAE OF *Schistosoma Mansoni* FOR 30 MINUTES[1]

Ointment and Per Cent Active Ingredient[2]	Ratio of Mice Protected (Autopsy)[3]	Number of Infected Control Mice (Autopsy)[4]	Relative Per Cent Protection[5]
1. Aldrin (1); Petrolatum; Olive Oil	1/11/14	6	23.5
2. Aquaphor (—)	0/13/15	10	78.5
3. Breck pH7 (—)	0/11/14	10	73.8
4. Breck Water Resistant Cream (—)	0/12/15	10	55.1
5. Chem-R-Pels (5); Petrolatum; Olive Oil	0/14/16	6	49.8
6. Chlordane (5); Petrolatum; Olive Oil	0/11/14	7	58.4
7. Copper Benzoate (5); Olive Oil; Petrolatum	2/13/15	9	87.6
8. Copper-2-Benzothiazol Sulfide (5); Petrolatum; Olive Oil	1/10/15	7	65.0
9. Copper Beta Benzyl Acrylate (5); Petrolatum; Olive Oil	1/ 6/15	6	87.1
10. Copper Butyl Phthalate (5); Petrolatum; Olive Oil	0/14/14	10	80.4
11. Copper Chelate of Bicyclic Hydroxymethylene Ketone (5); Petrolatum; Olive Oil	0/10/15	11	68.2
12. Copper (II) Complex of 5-Chlorosalicylamide (5); Olive Oil; Petrolatum	6/13/15	4	86.8
13. Copper 2-3-Dichloro-6-Oxo-6-Phenyl Sorbate (5); Petrolatum; Olive Oil	1/ 9/12	8	79.4
14. Copper Dimethyl Dithiocarbamate (5); Petrolatum; Olive Oil	0/13/15	11	73.5
15. Copper 2,5-Dimethyl-1-4 Piperazine Bis(Carbodithioate) (5); Petrolatum; Olive Oil	0/11/15	6	64.2
16. Copper-O-Amino Benzoate (5); Petrolatum; Olive Oil	1/ 7/ 9	8	83.6
17. Copper Stearate (10); Petrolatum; Olive Oil	0/13/17	10	45.8
18. Covicone (—)	1/54/60	24	24.8
19. Cryolite (5); Petrolatum; Olive Oil	2/12/15	10	87.4
20. Crude Red Mud (50); Aqaphor (50)	1/ 5/ 5	10	77.1
21. Dieldrin (3); Petrolatum; Olive Oil	0/ 3/15	8	89.3
22. Dieldrin (1); Petrolatum; Olive Oil	0/ 9/15	4	69.9
23. Dioctyl Phthalate (10); Petrolatum	1/13/15	7	30.7
24. Endrin (5); Petrolatum	0/ 2/15	12	25.9
25. Endrin (1); Petrolatum	0/ 1/14	9	60.0
26. Gamma Chlordane (5); Petrolatum; Olive Oil	1/13/14	8	57.3
27. Heptachlor (5); Petrolatum; Olive Oil	0/ 2/15	5	0.0
28. Heptachlor (1); Petrolatum; Olive Oil	0/ 7/15	4	78.6
29. Hexachloroethane (5); Olive Oil; Petrolatum	6/10/15	6	57.1
30. Iodonium Sulfate; Bis(Chlorophenyl) (5); Petrolatum; Olive Oil	0/ 8/13	8	74.8
31. Kerodex 71 (—)	0/14/15	7	51.5
32. Kwell (—)	0/ 9/13	5	47.6
33. Metaldehyde (10); Petrolatum; Olive Oil	0/14/15	8	37.7

[1] Usually a minimum of 15 "protected" mice were exposed along with 10 controls. Additional lots were exposed in some instances.

[2] The per cent of the active ingredient by weight appears in parenthesis; a dash indicates this is unkown.

[3] This is expressed in a "fraction" as 10/12/14; i.e., 10 of 12 mice surviving to autopsy were negative for *S. mansoni,* the last figure (14) means that a total of 14 were exposed, but the difference (2) died before autopsy.

[4] In some instances less than 10 control mice survived to autopsy. However, all control mice posted were positive for adults of *S. mansoni.*

[5] Relative per cent protection indicates the *degree of infection* in the "protected" mice. The relative per cent protection is calculated as follows: Where the average number of worms recovered per control mouse is "x," the average number of worms per "protected" mouse is "y" and the per cent relative protection is "z." Then, $z = (x - y)/x$. Example: $x = 45$, $y = 35$, $z = (45 - 35)/45 = 22.2\%$ relative protection.

TABLE II—(*continued*)

Ointment and Per Cent Active Ingredient[2]	Ratio of Mice Protected (Autopsy)[3]	Number of Infected Control Mice (Autopsy)[4]	Relative Per Cent Protection[5]
34. N-521 (5); Petrolatum; Olive Oil	2/15/15	4	81.3
35. Ortho Slug Dust (5); Petrolatum; Olive oil	0/11/14	8	86.7
36. Petrolatum (50); Ether (50)	0/14/15	6	29.4
37. Phenatox (10); Petrolatum; Olive Oil	1/ 6/15	7	73.2
38. Phenatox (3); Petrolatum; Olive Oil	0/ 9/13	8	0.0
39. Polyethylene Polysulfide (—)	0/15/15	6	0.0
40. Prophylactic Ointment (—)	0/12/15	7	0.0
41. Saponin (10); Petrolatum; Olive Oil	1/ 8/14	7	87.4
42. Saponin, Tech. (5); Petrolatum; Olive Oil	0/10/13	6	78.1
43. Strobane (10); Petrolatum	0/ 9/15	8	81.7
44. S-Trithiane, 2, 4, 6 Tris (*p* Hydroxy Phenyl) (3); Petrolatum; Olive Oil	0/13/15	8	70.0
45. Superfloss (10); Petrolatum; Olive Oil	1/12/14	7	46.9
46. Toxaphene (5); Petrolatum; Olive Oil	0/14/15	2	47.2
47. Vanillic Acid (3); Petrolatum	0/13/15	5	50.4
48. VL-600 Latex (—)	1/11/15	6	45.7
49. Zinc Stearate (10); Olive Oil; Petrolatum	2/14/15	10	77.0

However, lest some potentially good compounds be eliminated, 90 "Per Cent Relative Protection" was arbitrarily selected as the lower limit for further testing.

Toxicity of Test Substances. It is realized that toxicity studies must be made. However, it is neither within the scope nor the province of this report to take such matters into consideration. Once the preparations selected by this screening have had a more thorough study and evaluation, the most promising ones will be tested by the Army's toxiological services.

Controls. The control mice averaged 52.5 adult *S. mansoni* per mouse and ranged from 8.6 to 70.1 worms per mouse. The low figure found in the controls in a few instances clearly indicated that the cercariae were not as viable as they should have been. This low number occurred in only a few experiments during the heat of the summer. Even in such cases, the "Per Cent Relative Protection" could be determined by applying the formula in footnote (5), Table I.

Discussion of the Groups of Chemicals Tested. Practically speaking, it is possible to separate the cercaricidal activity of the compounds screened into groups which represent their chemical configuration and stability. Actually, the most useful grouping is to consider the chemicals as: insecticides, insect repellents, protoplasmic poisons, ointment vehicles or "bases," and a miscellaneous group.

The insecticides tested represented the chlorinated hydrocarbons, chlorinated camphenes, chlorinated cyclohexanes, benzene derivatives, alcohol derivatives, plant extracts, and thiocyanate derivatives. Of 28 commercial insecticides screened, 13 proved effective against the cercariae for 30 minutes.

Of the 19 insect repellent mixtures tested in suitable vehicles, 18 afforded complete protection for 30 minutes. When mixed with other vehicles besides petrolatum, these repellents and repellent mixtures continued to prove effective for 30 minutes.

The protoplasmic poisons tested included those known to be bactericides, molluscicides, piscicides, spermicides, fungicides, and vermicides.

The *bactericides* used were all quaternary ammonium salts. All proved to be effective for 30 minutes.

Of the four *mulluscicides* tested, *Santobrite* (sodium pentachlorophenate) alone af-

forded complete protection for 30 minutes. However, *Santobrite* appeared to have a high degree of toxicity for mice.

Of nine *piscicides* tested, seven showed well in the preliminary tests.

Both of the two *spermicides* tried gave complete protection for the 30 minute test.

Three of the six *fungicides* tested proved completely effective for the 30 minute test.

In these tests the two vermifuges selected were ineffective.

The *ointment* vehicles or "bases" used were screened in the same manner to determine the degree of mechanical protection offered. Table I, Group I, shows the protection afforded by the better ointment vehicles. Commercially prepared ointments (i.e., potential vehicles), which proved to be effective for 30 minutes were: Kolpix A and D, Silicote, Kerodex 51, Prantal, Pro-derna, Ply-3 and Ply-9 Gel, ZAC, and Aerolube. Further tests will be run on all vehicles to determine whether other ingredients can be added that will increase their effectiveness.

A group of miscellaneous compounds was tested because they had features in common with some of the more effective ointments.

Compounds of the following metals were screened to determine their efficiency: copper, arsenic, zinc, barium, sodium, calcium, antimony, mercury, and aluminum. Eighteen copper compounds were tested, of which three provided protection for 30 minutes.

Of the total preparations screened, 46 afforded complete or 100 "Per Cent Relative Protection" while 39 others gave 90 to 99 "Per Cent Relative Protection" for 30 minutes against the cercariae of *S. mansoni* and 49 provided less than 90 "Per Cent Relative Protection."

Summary

One hundred and thirty-four ointments were used in a Preliminary Screening Test in an attempt to determine which ointments warranted further testing as protective agents against the penetration of cercariae of *S. mansoni*. Of these 134, 85 preparations gave 90-100 "Per Cent Relative Protection" for white mice for 30 minutes against the cercariae of *S. mansoni* of which 40 gave 100 "Per Cent Relative Protection." The remaining 49 yielded less than 90 "Per Cent Relative Protection."

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Epidemiologic Investigation of Diarrhea Outbreaks

By

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THE occurrence of common diarrhea among the patrons of a mess may be likened to the presence of coliform organisms in milk: neither is in itself serious but both indicate serious conditions which may give rise to disease of tremendous importance. It is for this reason that we believe it worthwhile to investigate thoroughly every outbreak of even mild diarrhea that is of sufficient magnitude and that occurs under such circumstances as to direct suspicion against a common mess. The importance, particularly in military life, of scrupulous attention to all phases of sanitation is universally acknowledged, for the dire consequences attending neglect of sanitation have made history.[1] However, it is human nature to become lax in the application of protective measures against any perennial danger, particularly so long as it is considered not to be imminent, whether it be the danger of attack by an aggressor nation or the danger of an epidemic of smallpox or other disease. Just as "sword clanging by a would-be aggressor prompts us to look to our defenses, so should the occurrence of common diarrhea traced to a mess stimulate us to effect and maintain those improvements in the sanitation of this mess that are required for protection against more serious disease. It is the purpose of this article to describe a system of epidemiologic investigation, tried and proved useful in the military situation, for identifying in diarrhea outbreaks not only the offending mess but also the offending meal and food item, thereby dramatizing the consequences attending breaches of sanitation and pointing the way to necessary correction.

This article is not written for the epidemiologist or the preventive medicine company. It is written for the physician in military service who is not an epidemiologist and who has not had postgraduate study, training, or experience in preventive medicine, but who, when confronted with an outbreak of common diarrhea among a military population that patronizes a common mess, is obliged—or ought—to undertake an epidemiologic investigation to discover the cause of the outbreak and to point the way to correction of the breach of sanitation. Diarrhea occurs so frequently and is so widespread in the military service that it would be impossible, if indeed desirable, to have every outbreak investigated by a specialist.

The system described in this article has been worked out through application in several diarrhea outbreaks in U. S. Army and Labor Service units in Munich, Germany, over the past few years. We found that, for efficiency and to save time for the investigating personnel and for the company under study, numerous details had to be attended to simultaneously. Full use had to be made in each outbreak of lessons learned and technics developed in preceding outbreaks. Thus, we developed a check list of things to be done, forms to be reproduced, persons to be contacted, et cetera, lest some detail be lost from sight and doom the investigation to certain failure, or obstruct and greatly prolong it. This article consists essentially of the presentation of this check list, with a brief discussion of each step and explanation of the relatively simple statistical calculations required to identify the offending food item in those instances when this cannot be done with the required certainty through simple inspection of the catalogued and compiled entries from the individual questionnaires and food sheets. It is our hope that physicians in the military service will not simply read this article, then lay it aside and be

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From Headquarters, Southern Area Command, United States Army, Europe. Colonel Holland is now assigned to the Office of the Surgeon, Aberdeen Proving Ground, Md. Reprinted from *U. S. Armed Forces Medicine Journal*, Vol. VII, No. 1, 43-58 (Jan. 1956).

unable to find it again, but that they will use it to guide their epidemiologic investigations when confronted with an outbreak of diarrhea.

The essential steps in this system of epidemiologic investigation are presented in their proper chronological order in italics, and those requiring further explanation and discussion are treated in the order of their appearance. Where needed, sample forms and statistical tables illustrate the steps. To achieve greater reality in presentation, this system is applied to an imaginary outbreak of diarrhea in a mythical "Company B" ("Baker").

Procedure for Investigation

On Saturday morning at 0800 hours several men of Baker Company appear at sick call with the chief complaint of diarrhea.

1. The medical officer in charge of the dispensary, hereinafter referred to as "the surgeon," questions patients to determine whether there is really an outbreak and, if so, to learn the approximate hour of onset in the first case.

In outbreaks of mild diarrhea, relatively few of the men affected report on sick call. Unless the surgeon has a sufficiently high index of suspicion to make inquiry, he might fail to learn that an outbreak has occurred. Any outbreak of diarrhea, regardless of its mildness and limited extent, should be investigated to identify and correct the deficient sanitation in the mess which caused the outbreak and which, if long uncorrected, could promote the spread of more serious food-borne disease.

2. The surgeon telephones the Commander of Baker Company to arrange to have the entire company available, starting at 1000 hours, for questioning; to get men from the company to help with the questioning; and to arrange for an immediate inspection of the mess.

If only Baker Company men have experienced diarrhea, it will probably be found that this company operates its own mess and messes separately.

It is of the utmost importance to question as many men of the company as possible—those "not ill" as well as those "ill" (these terms are used in their epidemiologic and not necessarily their clinical meaning). "Well" and "not ill" are used interchangeably, as are the terms "ill" and "case." Suppose, for instance, that the vehicle for the offending micro-organism was a pudding, which was eaten by most of the men in the company, for example, 90 per cent. If only 40 men were interrogated, 20 of them from among those ill and 20 from among those well, it might well happen that none of the 20 ill men failed to eat the pudding and that only 4 of the 20 well men failed to eat it. (Note that in this group of 40 men, 36, or 90 percent, ate the pudding and 4, or 10 per cent, failed to eat the pudding.) This looks like pretty strong evidence against the pudding, but it can be shown by the chi-square test (described later) that the association between eating the pudding and getting sick in this particular group is not a statistically significant association. Suppose, however, that instead of interrogating 40 men out of the company we interrogated 200 men and found that among 80 ill men in the group none had failed to eat the pudding, while of the 120 well men there were 20 who did not eat it. (Here again 90 per cent of the men ate the pudding and 10 per cent failed to eat it.) We would now have valuable evidence to incriminate the pudding, because it can be shown by the chi-square test that there is in these data a highly significant association, statistically speaking, between eating the pudding and becoming ill. Unless some other explanation is found to account for this association, the evidence indicates the pudding as the source of the outbreak.

The investigation must keep the men of the company away from their duties for as short a time as possible. Also, the sooner the interrogation is undertaken, the more reliable will be the answers. For these reasons, men of the company are used as interviewers. If a good questionnaire is developed, like that illustrated in figure 1, and if men of average or higher intelligence are used as interviewers and instructed beforehand in

"M" Mess (mess at which the group struck by the outbreak ordinarily eats and/or presumably ate during the incubation period of the disease featured in this outbreak).

"S" day (date on which symptoms first appeared in the first case properly classed *as a part of this outbreak*, not a coincidental case).

INSTRUCTIONS: Use 24-hour time, *e. g.*, 0900 for 9:00 A.M.; 1500 for 3:00 P.M. Question every individual regardless of whether he is sick, has been sick, or remained well. Be sure he understands each question. If he IS NOT SICK or WAS NOT SICK, delete by diagonal lines and omit questions 3 to 7 inclusive and question 12.

1. Questionnaire filled out on ....., 19 ..... at hour .....

2. .....
(Last name) (First name) (ASN) (Unit)

3. Place an X after each of the following symptoms suffered:

Sick at stomach ..... Bowels loose ..... Shaking chills .....

Vomiting ..... If so, state number of movements ..... Belly gripes or cramps .....

4. Other symptoms (list them) .....

.....

5. Which symptom appeared first? ..... Exact hour and date .....

6. Did your sickness begin suddenly? ..... Was it severe? .....

7. Are you still sick? ..... If not, how many hours were you sick? .....

8. State hour at which you ate each of the meals you had at "M" Mess on .....,

19 ..... ("S" day)

Breakfast ..... Dinner (lunch) ..... Supper .....

9. Indicate by an X in appropriate space which of the meals you had at "M" Mess on .....,

19 .....(the day before "S" day).

Breakfast ..... Dinner (lunch) ..... Supper .....

10. Indicate by an X in appropriate space which of the meals you had at "M" Mess on .....,

19 ..... (the day before the day before "S" day).

Breakfast ..... Dinner (lunch) ..... Supper .....

11. Indicate by an X in appropriate space which of the meals you had at "M" Mess on .....,

19 ..... (the day after "S" day).

Breakfast ..... Dinner (lunch) ..... Supper .....

12. Did you eat at any place other than "M" Mess during period ..... to .....,

19 ..... ("S" day, the day before "S" day, and the day before the day before "S" day)? If so, indicate below where you ate, what you ate, and at what time: .....

.....

REMARKS (Indicate to which question each refers) (Continue on reverse side): .....

.....

.....

.....
(Signature of interviewer)

FIG. 1. Individual questionnaire for investigation of diarrhea outbreak.

the use of questionnaire, data can be obtained as reliable as the trustworthiness and memory of the men interviewed will permit.

To ferret out the cause of an outbreak and to determine the manner in which it operated, it is necessary to identify as many as possible of the ill persons who form a part of the outbreak in question. It is more important that no man be listed as ill when he is not than that every ill person be listed. For this reason, gross symptoms—for example, vomiting, diarrhea, and cramps, are inquired into by means of the questionnaire. Lay interviewers, making use of questionnaire forms worded in simple, readily intelligible language, can after brief instruction elicit fairly reliable answers as to gross symptoms experienced. As a further safeguard against including "false positives" as ill patients, incontrovertible criteria, such as passage of two or more stools or vomiting, are set up for determining who of the men are ill. Such qualifying criteria will, of course, miss patients with mild but epidemiologically bona fide illness—for example, those with only nausea or abdominal cramps. However, these safeguards will tend to prevent including as ill those men who, by the power of suggestion, might report as symptoms of sickness such physiologically normal phenomena as hunger pains, borborygmi, and postprandial gastrocolic reflex.

If one is obliged to choose between a small number of questionnaires carefully completed by physicians or other medical experts and a much larger number of questionnaires less accurately completed by hastily recruited and trained lay assistants, one should elect the latter, at least when one is dealing with a diarrhea outbreak, because it is necessary only to be sure that every man listed as ill really is ill, and to learn which items of food every man in the study ate. These conditions can be fulfilled through observing the precautions outlined in this article.

3. The surgeon makes the necessary changes in the questionnaire, as illustrated in figure 1, to adapt it to serve a particular outbreak, and has sufficient copies reproduced.

4. The surgeon contacts the laboratory and requests necessary culture media and service.

It is suggested that enough tubes and plates of media be obtained to culture 30 specimens, half of them for pathogenic gram-negative enteric bacilli, and half for gram-positive cocci.

5. The surgeon dispatches a messenger to pick up the culture media.

6. The surgeon then proceeds to the mess to learn certain things about the composition and preparation of meals served during the "period of greatest probability" (explained below) and to conduct a sanitary inspection.

The following are some of the things he does:

(a) Requests that any leftover food be placed in the refrigerator and left there, untampered with, until the surgeon indicates other disposition.

(b) Inspects the master menu for each meal served in the mess during the "period of greatest probability."

(c) Writes down the ingredients (particularly leftovers) that went into each food and beverage served at each meal during this period; when and how each food and beverage and their ingredients were prepared and handled; how long each of these items was left unrefrigerated after, or at any time during, its preparation; and any other information that might give a clue as to the possibility of pathogenic micro-organisms from human or animal sources being implanted on, or allowed to propagate in, any food or beverage or any ingredient thereof.

(d) Inquires carefully if any "extra" item of food or beverage was served at any meal during the period in question either as a substitute for, or supplementary to, foods and beverages listed in the master menu. Writes down the required detailed information for each such "extra" item.

(e) Records the identity of each person who in any way took part in preparing or serving any food or beverage served during this "period of greatest probability" and

causes each such person to be subjected to such interrogation and physical and laboratory examinations (see step 13 below) as may be necessary to determine if at the time he engaged in handling any of these foods or beverages he could have carried the microorganism of the disease featured in the outbreak.

(f) Records details of any sanitary deficiencies which he learns occurred in the mess within the past several days, *e. g.*, interruption of refrigeration, lack of hot water, lack of soap or other detergent, prevalence of flies or vermin, et cetera.

(g) Conducts a thoroughgoing sanitary inspection of the mess and premises, checking particularly such things as the temperature of the dish water; the temperature and cleanliness of the refrigerator and the condition of its contents; methods of preparing and serving food; prevalence of flies; signs of rats, mice, roaches; and personal hygiene practices on the part of food handlers.

The "period of greatest probability" is that period which, immediately preceding the hour of onset of symptoms in the first case of the outbreak, is as long as the median incubation period of any disease which is likely to be causing this outbreak. Care should be taken to avoid the mistake of reckoning the onset of the outbreak on the basis of a case which might be *coincidental with,* but *not a part of,* the outbreak. Unless the outbreak is clearly staphylococcus toxin food poisoning, one should, to be on the safe side, make this "period of greatest probability" cover about 30 hours, because this is as long as the median incubation period of salmonella infections and is longer than the incubation period of the diarrhea most commonly observed in the Army (the variety that we have in mind fits most closely Dack's[2] description of streptococcus food poisoning). To illustrate: If the first patient detected in the outbreak became ill around 2000 hours on Friday, one should consider the "period of greatest probability" to include breakfast, dinner, and supper Friday, and supper Thursday.

7. The surgeon then has food sheets made and reproduced like that illustrated in figure 2.

Findings obtained through step 6 guide the preparation of the food sheets and dictate which items of food and drink are to be entered in its headings. Across the top of the sheet are listed the individual foods and beverages (grouped by meals) served during each meal in the "period of greatest probability," and merely the name of each meal (not items served) for 24 hours preceding that period. It is of the greatest importance

Outbreak beginning on _____ *19* ____ *among patrons of mess of* _____

Foodsheet No.		Individual items of food and beverage for "period of greatest probability"				For 24-hour period preceding "period of greatest probability"			
Name of person	No.	First meal	Second meal	Third meal	Fourth meal	First meal	Second meal	Third meal	Fourth meal

FIG. 2. Food sheet for investigation of diarrhea outbreak.

that all foods and ingredients be listed which are likely to serve as the vehicle for diarrhea-producing micro-organisms. Other foods such as bread, sugar, black coffee, sugar syrups, dry cereals, et cetera, need not be listed except when they merit suspicion in conjunction with other food. For instance, where appropriate, instead of listing "coffee," list "cream (in coffee)," and instead of listing "canned peaches," list "whipped cream (on canned peaches)."

8. The surgeon next organizes his staff, including the men lent him by Baker Company, into two interviewing teams, one to complete the individual questionnaires, illustrated in figure 1, and the other to complete the food sheets, illustrated in figure 2.

9. The surgeon then thoroughly instructs the interviewers.

He reads and explains to them the entries in the forms and impresses them that they must ask each question carefully, and must make sure that each man interviewed answers as accurately as his recollection permits, to make it possible to classify all men as "ill" or "well" (in the epidemiologic sense) and to learn which items of food and drink each man consumed.

10. The surgeon arranges to have rooms fitted out to serve for the interviewers, with a table and two chairs for each interviewer. Those filling out the individual questionnaires should operate in a room separate from those filling out the food sheets.

11. As groups arrive to be interviewed, each should be under the control of a company noncommissioned officer, who directs the men quietly to enter one or the other of the interview rooms when required, and to go to the next room for the second interview when finished.

It does not matter which interview is done first. Any person whose answers to questions 8 through 10 indicate that he has not eaten a meal at the mess during the period covered by the questionnaire is promptly dismissed and excluded from the study. However, of the group that did eat a meal at the mess during this period, both ill and well persons have to be subjected to both interviews.

12. The surgeon supervises the interviewing while it is in progress, to ensure that the proper questions are asked and answered in the correct manner, and that the entries are correctly written.

13. The surgeon selects typical patients and suspected mess personnel for bacteriologic examination of their stool specimens.

The contributions made by the laboratory toward determining the causative organism in "run-of-the-mill' diarrhea outbreaks vary greatly. Generally, the laboratory results are disappointing, possibly because the offending organism is so often ubiquitous and indistinguishable culturally from nonpathogenic members of the group to which is belongs. Another possible reason is that an insufficiently wide assortment of culture media are used to isolate and identify every possible offending organism, whatever be the group to which it belongs. For instance, media which would promote the growth and identification of bacteria of the salmonella group might not support the gram-positive cocci, and vice versa. Often to blame is lack of sufficient competence and interest on the part of personnel taking and handling specimens and on the part of laboratory personnel examining them.

The evidence incriminating a particular food as the cause of an outbreak of diarrhea is generally at best circumstantial, but the greater the volume and reliability of such evidence, the better. The proof that the suspected item of food caused the outbreak is satisfactorily established by finding a diarrhea-producing organism in that food, the same organism in the stool, secretions, or lesions of a person known to have handled that food and in the stools of persons known to have eaten that food. However, less substantiating evidence will do. The *sine qua non* for incriminating a food is *not* that it be found to contain a diarrhea-producing organism, *nor* that this organism, if found in the food, also found to be harbored by a handler or consumer of the food. The *sine*

quo non is that it be shown that none became ill who did not eat the suspected food and that all who became ill ate the suspected food. It is not necessary to prove that all who ate the food became ill, inasmuch as individual persons vary in susceptibility, some will eat more than others, and the causative organisms may be so dispersed in the mass of food that not every serving will contain them, or enough of them to produce disease. The epidemiologic investigation, therefore, can yield findings which, unsupported by laboratory findings, can indicate which item of food caused the outbreak. This investigation can at times also indicate the identity of the offending organism, how and by whom it was implanted on the food, and how, once implanted it was able to multiply.

14. In order to facilitate the study, the surgeon has the food sheets attached together to make one long sheet or series of long sheets.

15. The surgeon then studies Baker Company's completed questionnaires and classifies each man as "ill," "not ill," or "questionable."

The severity of illness, as mentioned before, is unimportant for epidemiologic purposes. Clinically questionable cases will occasionally be observed which defy hard and fast classification. Such cases should be excluded from the study, their names and food data crossed off the food sheets, and their questionnaires removed from the others.

Having once classified a man, the surgeon must not change his classification, however strongly tempted by later findings to do so. An example would be his classification as ill of a man who reported not having eaten the food most strongly suspected of causing the outbreak. Such a discrepancy might be attributed to one of two things: that the man answered incorrectly deliberately, or because he did not understand the question, or because his memory did not serve him right; or that his was a coincidental illness and not epidemiologically a case belonging to the outbreak. Such cases which patently do not fit the pattern can, in fact, rightly be considered and reported as not belonging in the outbreak, provided care is taken to avoid bias. In other words, incorrect replying should not be assumed expressly either for the purpose of incriminating or exonerating a particular food. Furthermore the number of ill persons labeled "coincidental" cases should not be greater than corresponds to the "normal" incidence of the disease (in this study, diarrhea) among the group. In other words, out of an American company located in Germany, for example, one or even two endemic cases of diarrhea can be expected to occur, on the average, every day, including the day on which an epidemic of diarrhea occurs. But it would be bias to label five cases as "endemic," that is, "coincidental," merely in order to avoid weakening the evidence against the food most strongly suspected of causing an outbreak.

16. The surgeon numbers each man according to his place on the combined food sheets and enters this number on the man's questionnaire. A red "X" is entered in the upper right-hand corner if the man is classified "ill," and no mark if he is classified "not ill."

17. The surgeon then has each "ill" man's name on the food sheet underlined in red, and a red mark drawn through each "X" mark that indicates an eaten food in the food-item list opposite his name. The hour that each man became ill is entered above his name on the food sheet.

18. The surgeon then makes preliminary inspection of the food sheets to learn, if possible, which items and meals should be considered as most likely to have caused the outbreak.

19. The surgeon again contacts the mess.

Having drawn up a list of suspected food items on the basis of his preliminary inspection of the food sheets, he sends his sanitary inspector with this list to the mess to learn which, if any, of such items are among the leftover foods which the surgeon requested be saved; to bring back samples of any found; and to release for proper disposition any leftovers not under suspicion.

20. The surgeon initiates necessary laboratory work.

He causes the inoculation into the proper media of specimens of the following: available leftover suspected foods; stools from selected typical cases; and stools and swabbings from the throats and suspicious skin lesions of suspected food handlers. He has the plates and tubes proberly labeled, and directs these, as well as gross specimens of any suspected leftover foods, to be properly packaged, labeled, and transported without undue delay to the hospital laboratory.

21. The surgeon then conducts as thorough a study, including statistical analysis of available data, as is required to identify conclusively the meal and the food item causing the outbreak.

He inspects the food sheets in order to exonerate nonoffending meals and to incriminate the offending meal and food in accordance with the following criterion: A food or meal can be considered responsible for the outbreak if everyone classified as "ill" reported having eaten it, while a substantial proportion of the group classified "not ill" reported having not eaten it.

At times a simple inspection of the food sheets will serve to exonerate certain *meals,* in that it shows that a substantial proportion of the men who became ill reported not having eaten these meals. By similar evidence, certain *foods* are exonerated. However, there is often one meal, and occasionally even one food in that meal, which fulfills —and stands out alone as fulfilling—the stated criterion. If this is the case, the surgeon is justified in considering that meal or food item to be the cause of the outbreak. More frequently no particular meal or food that completely fulfills this criterion can be found through simple inspection of the food sheet entries. Often exceptions will be found that on the surface invalidate the "perfect" evidence against a particular meal or food. For example, some persons classified as "ill" may report *not* having eaten it. Sometimes by interrogation and investigation it can be shown that some or all of these persons appearing to be exceptions actually had coincidental cases of diarrhea, not cases belonging to the outbreak. Faulty memory, or deception, or incorrect asking of the question may have caused a person to state that he did not eat the suspected food when in reality he did eat it. As previously explained, however, definite precautions must be taken in making these excuses lest bias be introduced into the study.

In the criterion as stated, it is postulated that a "substantial" proportion of the group classified "not ill" did *not* eat the food item. Obviously, if everybody ate a particular item of food there would be no basis for comparison between ill and well men with respect to eating this item, and it would therefore be impossible to adduce statistical evidence sufficient to incriminate this item.

Up to this point, no statistical treatment of data has been required except counting "ill" and "well" persons, and persons eating and persons not eating each of the meals and each of the several items of food. If, however, no one meal or food item is found to satisfy the criterion, the surgeon must test the soundness of his opinions and conclusions—that is, subject to statistical scrutiny and testing the data on which such opinions and conclusions were based.[3] There is a very simple test, namely, the chi-square test,[3,4] which is suitable for use in connection with the epidemiologic investigation of the type of outbreak under discussion.

The differences between corresponding "expected" and "observed" proportions in the above illustration are of such magnitude as to raise a question as to the validity of the hypothesis that eating pudding had nothing to do with causing illness. The chi-square test would be useful in testing this suspicion, through determining the statistical significance of these differences. This test yields a value for chi-square for which there can be found in statistical textbooks[3,4] the value for the corresponding "P" (tables 1 and 2). "P" means "probability" and is a measure of the likelihood that chance alone accounts for the differences seen between corresponding "ex-

EXAMPLE OF USE OF CHI-SQUARE TEST IN CONNECTION WITH THE EPIDEMIOLOGIC STUDY OF A DIARRHEA OUTBREAK

Number of men interviewed 300
Of whom there were classified "ill" 200 (2/3 of 300)
Of these same 300, the number eating pudding was 270 (9/10 of 300)

If eating pudding had nothing to do with causing illness		*However*
"Expected" findings would be that:		*"Observed" findings* were that:
Of the "ill" men, numbering	200	
9/10 ate pudding, or	180	195 of the 200 "ill" men ate pudding
1/10 did not eat pudding, or	20	5 of the 200 "ill" men did not
	Eaters 180	195 Eaters
"Expected" proportion	——	—— "Observed" proportion
	Total 200	200 Total
Of the pudding eaters, numbering	270	Of the 270 pudding eaters:
2/3 became "ill," or	180	195 became "ill"
1/3 remained "well," or	90	75 remained "well"
	Ill 180	195 Ill
"Expected" proportion	——	—— "Observed" proportion
	Total 270	270 Total

TABLE 1. "FOUR FOLD TABLE" USING THE STATISTICS FROM THE EXAMPLE OF USE OF CHI-SQUARE (χ^2).

	Ate	Did not eat	Total
Ill	a 195 (180)	c 5 (20)	a+c 200
Not ill	b 75 (90)	d 25 (10)	b+d 100
Total	a+b 270	c+d 30	a+b+c+d 300

Numbers in parentheses are "expected" findings.

2. Formula for computing χ^2:

$$\chi^2=\frac{(ad-bc)^2(a+b+c+d)}{(a+b)(c+d)(a+c)(b+d)}$$

3. Where there are small numbers, use the following formula (with Yates' correction):

$$\chi^2=\frac{(|\,ad-bc\,|\,-\frac{1}{2}(a+b+c+d))^2(a+b+c+d)}{(a+b)(c+d)(a+c)(b+d)}$$

(the symbol | | means the absolute value.)

pected" and "observed" proportions. The smaller the "P," the less this likelihood. In the example above, the chi-square (with Yates' correction) is 35.04, for which the corresponding "P" is *less than* 0.005. This is well within the range of "P" (0.05 and less), to which statistical significance is ordinarily attributed, However, a "P" within the range of statistical significance does not mean that chance did *not* account for the difference from which the "P" was derived. It only means that a cause-and-effect relationship should be postulated between the events in question (*e. g.*, eating pudding and becoming ill) unless and until shown to be untenable on the basis of good and sufficient evidence.

If for several foods "P's" are found by the chi-square test which are within or near the range of statistical significance, *i.e.*, 0.05 or less, consideration must be given to the possibility that the causative agent might be a "common denominator" ingredient, *e. g.*, milk, common to several or all of the foods

TABLE 2. TABLE OF CONVERSION OF χ^2

χ^2	P	χ^2	P
.000157	.99	1.074	.30
.000628	.98	1.642	.23
.00393	.95	2.706	.10
.0158	.90	3.841	.05
.0642	.80	5.421	.02
.148	.70	6.635	.01
.455	.50	7.85	.005

for which such "P's" were found. If, for example, the "P" found for coffee cream in a particular outbreak is less than 0.05, then the "P's" for other suspected items of food should be computed. Such values of "P" would be well within the range of values explainable by chance alone, most likely between 0.20 and 0.80, *unless* the same cream, or the milk from which it was taken, was served as a part of other foods or in other forms than as coffee cream. This happened in one outbreak studied by the authors, and a chi-square test was run on the basis of the observed difference between two proportions, namely, the proportion of the ill group constituted by consumers of milk or cream *in any form,* and the proportion of the well group constituted by consumers of milk or cream *in any form.* This chi-square test gave a "P" definitely within the range of statistical significance and showed that the "common denominator" was milk or cream in whatever form it was served. For the *non-milk-or-cream-containing* assortment of foods a "P" of 0.23, or 1 in 4, was obtained, which is well within the range explainable by chance alone. Thus, through actual computation the authors refuted the anticipated argument that for *any other* assortment of foods there might have been obtained as good a "P" as was obtained for the milk-or-cream-containing foods as a group.

If, however, the "P's" for several items of food are found to be within or near the range of statistical significance and yet no "common denominator" food ingredient is incriminated, consideration must be given to the possibility that as the result of improper sterilization the utensils in which these foods were prepared or served may have contaminated these foods with the causative organism.

The surgeon is not expected to be a statistician. He has merely to make a table like the one illustrated in table 1; enter in it the values for a, b, c, and d; and turn the table with these values and the chi-square formula over to any one who knows what the simple algebraic expressions mean and who can add, substract, multiply, and divide. This person could then derive the value of chi-square, for which the surgeon could then find the corresponding "P" in the table in table 2 or in a textbook of statistics.[3,4] The use of a calculating machine, although not indispensible, would materially facilitate the mathematical computations and ensure greater accuracy. If the surgeon finds that more "formidable" statistical procedures are required, he should consult a statistician. There is probably one in the office of the surgeon of the next higher headquarters.

If the surgeon finds one meal only, and/or one food item only, for which the chi-square test gives a "P" of 0.05 or less, he can, with reasonable assurance, incriminate this meal and/or food as the source of the outbreak. The same is true for any "common denominator" food ingredient.

If for no food or beverage item a "P" within or near the range of statistical significance is found, the surgeon checks the chi-square formula on each of the meals for the 24-hour period preceding the "period of greatest probablity."

If for any one of the meals served during the 24-hour period preceding the "period of greatest probability" the chi-square test yields a "P" within the range of statistical significance, that meal can be incriminated. In this event it might be well to recall a sufficiently large "sample" of ill and well members of Baker Company to ask them which of the individual food items they ate at that meal. The master menu for that meal should be studied and such information should be elicited for that meal as was elicited through the mess inspection in step 6 for the meals served during the "period of greatest probability." In the absence of detailed food sheet entries for the incriminated meal, the story concerning the preparation and handling of food served at this meal may yield presumptive evidence against one particular item of food.

22. If studies to this point have turned up anything which should form the basis of "stop-gap" instructions to Baker Company,

the surgeon issues such instructions to the company commander or his designated representative.

23. The surgeon then writes to the appropriate commander a special sanitary report of this outbreak with recommendations for corrective action and prevention of future outbreaks.

He should use language easily understood by a layman.

He should state such of the following as is applicable and determinable: Time of the outbreak; its magnitude in terms of percentage classified as "ill" out of the group interviewed; the fact that only the one company was affected, and that this company operates its own mess and that no other unit messes with it; the clinical picture of the typical case and roughly the proportion of mild, moderately severe, and severe cases; the meal and food item incriminated as the cause, with a brief account of supporting epidemiologic and laboratory findings; and any positive findings made on inspection of the mess, study of the master menus, interrogation and examination of food handlers, et cetera, which might indicate faulty mess sanitation or food handling practices.

24. The surgeon includes a copy of this special sanitary report and refers to it in his next monthly sanitary report.

Summary and Conclusions

The system of epidemiologic investigation described herein has been found, on trial, to be effective in identifying the offending item of food and discovering and pointing the way to the correction of the sanitary deficiency at fault in outbreaks of common diarrhea in military units. This system is characterized by the use of untrained personnel for the collection of statistical data and by statistical analyses so simple that they can be carried out successfully by medical officers who have little or no experience in epidemiology. Only a few hours' time is required for interviewing an entire company, and because the men are brought to the interview in increments no man need be kept from his duties more than an hour. It is possible to so organize and process the groups as to occasion little loss of company training or duty time.

It is believed that this system, with some modifications, would prove useful also in investigating diarrhea outbreaks attributable to a common mess in other "captive" groups, such as inmates of a prison or eleemosynary institution, or groups who could be readily reassembled for interviewing, such as patrons of a banquet or church supper and, under certain circumstances, the customers of a restaurant. It is further believed that this system could be adapted for use in the investigation of outbreaks, among such groups, of food-borne diseases other than common diarrhea.

This article does not attempt to offer a course in epidemiology, supplant the epidemiologist or the preventive medicine company, or advocate that the system of epidemiologic investigation described be employed indiscriminately. Rather it is intended to advocate the application of this system in any food-borne disease outbreak in which circumstances will permit or warrant its use.

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Endocrine Effects of Trauma

By

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WHEN an animal or a human being is subjected to trauma, there is an increased secretion of adrenocorticotrophic hormone and adrenal corticoids. This occurs during the early post-traumatic period. The anterior pituitary secretes ACTH, which stimulates adrenal cortical production of corticoids. It has been shown that, as the blood level of corticoids increases, further production of ACTH is inhibited.[1,2] Also, when the blood level of corticoids decreases, increased production of ACTH occurs.[3]

The normal size of the adrenal cortex is maintained as long as the hypophyseal portal system of blood vessels connecting the hypothalamus and the anterior pituitary are intact.[4] The blood flow in the portal system is from the median eminence of the hypothalamus to the anterior lobe of the pituitary.[4] It was shown by Harris and Jacobsohn[5] that transplantation of the pituitary to the temporal lobe of the brain or the anterior chamber of the eye is followed by atrophy of the adrenal cortex, even though the pituitary is well vascularized.[5] If, however, the pituitary is transplanted back under the median eminence of the hypothalamus, and the hypophyseal portal system regrows, the adrenal cortex does not atrophy.[5] These experiments suggest that there may be a humoral substance which comes from the hypothalamus and reaches the anterior pituitary through the portal system.[5]

When an area of the body is traumatized, afferent nerve impulses arising from the injured area travel up to the hypothalamus. At this level it is thought quite possible that the nervous impulses are transformed into a humoral substance which stimulates the pituitary to release greater amounts of ACTH than occurs in the resting state.[5]

It has been postulated by Sayers[6] that the traumatized tissues use up corticoids, thus lowering the level of adrenal cortical hormone and thereby stimulating more ACTH release from the anterior pituitary by removal of corticoid inhibition. Against this theory, however, is the cogent fact that ACTH is released within ten seconds following a histamine injection or sensory nerve stimulation. This rate is much too rapid for the body cells to have been influenced by a substance in the blood stream to take up more circulating corticoids. Also, after injury occurs, blood corticoids actually rise instead of decrease. It has been shown too that moderate trauma to a denervated extremity does not produce an ACTH release whereas the same trauma to an enervated extremity does.[4]

The traumatized intact human excretes markedly increased amounts of urinary 17-hydroxycorticoids.[4,10] Prolonged stress produces both an increased amount of cortical steroids and hypertrophy of the adrenal cortex, which indicates that prolonged ACTH secretion has occurred in spite of high levels of blood corticoids.[4]

Selye[7] found that in well nourished individuals the urinary excretion of glucocorticoids rises very markedly following a sudden systemic stress (trauma, bone fracture, burn) from the normal value of 60 to about 400 gluco-corticoid units per 24 hours. However, in chronically ill undernourished individuals subjected to similar stresses, the rise of gluco-corticoid excretion is slight or absent.[7]

Stevenson et al.,[8] found that among four healthy males suffering acute damage, there was a sharp rise in 17-ketosteroid output (confirming Forbes[9]) followed in the majority by an immediate fall. Then there was a gradual rise in daily excretion as convalescence progressed. uring convalescence,

marked peaks of 17-ketosteroid excretion were frequently seen, not only on further damage, such as minor operations, but also on excretion.

In Hume's laboratory it has been shown that when using cord-sectioned dogs, it is possible to traumatize denervated limbs of dogs without producing a rise of ACTH as is shown by eosinophil counts.[4] Gordon[11] has shown, while working with rats, that fracture of a bone in a denervated extremity will not produce an ACTH release, but that a burn of the leg will. Hume found that with the trauma of the cord section itself, there is a good eosinophil fall indicating an increased output of ACTH. Following the cord section, however, two standard operations on the denervated portions of the body failed to elicit an eosinopenic result. Another similar operation on the still enervated extremity brought about a good fall in the total eosinophil count. All of these operations were done under anesthesia. These experimental data make it appear unlikely that the "peripheral-humoral" theory can explain the increased ACTH release which follows trauma.[4]

Epinephrine is released into the blood stream in trauma, and it has been shown that this substance can cause a release of ACTH. It is thought that epinephrine causes ACTH release by acting directly on the hypothalamus, as its effect is abolished by hypothalamic lesions. It has been shown in Hume's laboratory that certain hypothalamic lesions in dogs will decrease or abolish the pituitary release of ACTH in response to operative trauma.[4] Apparently the median eminence must be intact for the normal release of ACTH following trauma. Stimulation of the median eminence of the dog will produce a release of ACTH from the pituitary, as shown by an eosinopenia. This has been shown to occur in the completely sympathectomized dog as well; therefore, it does not depend on the release of epinephrine. Stimulation of the posterior tuber cinereum has likewise shown an eosinopenia. If the adjacent areas of the hypothalamus are stimulated, there is no drop in the total eosinophil count indicating no realease of ACTH.[4]

It has therefore been asserted that there is a neurosecretory center located in the ventral hypothalamus which controls the release of ACTH following trauma. Also, nerve impulses from the injured area are necessary for initiating this response. In severe trauma, there are apparently other additional pathways which lead to a release of ACTH. These pathways are as yet unknown.

Uotila,[12] as well as Wolf and Greep,[13] reported exposure of rats to cold increased the activity of the thyroid, provided that the pituitary was present. Uotila showed that it was necessary to have the hypophyseal stalk intact. Starr and Roskelly[14] observed that in rats exposed to temperatures of 12 to 17 degrees C., the thyroid cells initially became hypertrophied.

It has been demonstrated by Leblond,[15] using radioactive iodine, that rats exposed to cold (0 to 2 degrees C.) for various intervals show questionable stimulation of the thyroid within the first three days, definite after seven days, maximal at 26 days and none at 40 days. It has been shown that many types of stress alter the quantity of radioiodine in the thyroid and in the serum. Epinephrine, as well as exposure to cold, increases the release of thyrotropin from the pituitary.[16]

Williams, Jaffe and Kemp[16] concluded that various types of stress resulted in the release of an increased amount of thyrotropin by the anterior lobe of the pituitary. This was followed by an increased secretion of thyroid hormone, but simultaneously there was an increase in the rate at which the body tissues utilized thyroxine.

It has been found that if an organism is continuously exposed to a certain type of stress, the resulting general adaptation syndrome evolves in three distinct stages; namely, those of the "alarm reaction," the "stage of resistance" and the "stage of exhaustion." The alarm reaction is the sum of all nonspecific systemic phenomena elicited by

sudden exposure to stimuli to which the organism is quantitatively or qualitatively not adapted.[17] The alarm reaction was first described in 1936[18] when it was realized that in response to a great variety of agents, the organism reacts with the same set of symptoms. This reaction subsequently has been shown to have two phases. It is said that the following is characteristic of the first or shock phase: tachycardia, decrease in muscular tone and body temperature, formation of gastric and intestinal ulcers, hemoconcentration, anuria, edema formation, decrease in blood chlorides, acidosis, a transitory rise followed by a decrease in blood sugar, leukopenia followed by leukocytosis, and discharge of epinephrine from the adrenal medulla. This particular phase may last anywhere from a few minutes to 24 hours depending on the intensity of the trauma. This phase is always followed by the counter-shock phase which is characterized by an enlargement of the adrenal cortex whose cells show signs of increased activity, acute involution of the thymus and other lymphatic organs and a reversal of most of the signs characteristic of the shock phase. Therefore, there is blood dilution and an increase in blood volume, increase in blood sugar and blood chlorides, alkalosis, diuresis, and often a rise in body temperature.[17]

The most important change, which occurs in the course of the general adaptation syndrome, is change in resistance to damaging agents. During this stage of resistance, a considerable degree of specific adaptation to the same alarming stimulus becomes evident, but if the stress is maintained over many weeks or months, this acquired adaptation breaks down. When this breakdown of adaptation occurs, we refer to it as the "stage of exhaustion."[17]

Moore and Ball (1952)[19] discovered in their cases of trauma that there was a decreased urinary excretion of sodium for two to five days, followed later by a sodium diuresis. They concluded that the drop in circulating eosinophils and the increase in excretion of steroid hormone products, are evidences of an accompanying endocrine readjustment involving the pituitary and adrenal cortex. It is unwise to overload a patient with saline solutions early postoperatively or post-traumatically since the adrenocortical hormones (primarily desoxycorticosterone), by their actions on the renal tubules, cause retention of sodium, chloride and water.

Howard and others (1946)[20] found the output of potassium to be excessive in patients suffering from fractures, the loss being greatest in the first 24 hour period. Wilkinson et al., (1950)[21] found increased excretions of potassium and phosphate occurring early in their human postgastrectomy cases with increases in the excretion of nitrogen and sulfur later.

Eliel et al.,[22] have shown that patients in whom hyperadrenocorticism occurred spontaneously or induced by administration of ACTH or cortisone, exhibited losses of nitrogen, potassium and phosphorus strikingly resembling those of operative trauma.

Following trauma,[23] the carbohydrate stores are mobilized as a result of the hyperadrenalinaemia which occurs early. The anterior pituitary is stimulated by the adrenalin with a liberation of adrenocorticotrophic hormone which in turn affects the adrenal cortex to an increased production of adrenal cortical hormones. These hormones promote gluconeogenesis from protein, therefore, increasing the glucose content of the extracellular space. The initial hyperglycemia is usually pronounced and prolonged and Selye[24] feels that this occurs perhaps to compensate for the increased glucose requirement of anoxic muscle. Later, however, when the glycogen stores are depleted, the secondary hypoglycemic phase ensues.

In conclusion, if an individual is to withstand trauma, the pituitary-thyroid-adrenal axis and its supporting organs must be intact. Failure of any link will greatly endanger life due to an abnormal response to injury. Patients with panhypopituitarism (Simmond's Disease), thyroid insufficiency (Myxedema), or adrenal cortical insuffi-

ciency (Addison's Disease), do not withstand trauma adequately.

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The Proposed Role of the Public Health Service Dental Officer in a National Emergency

By

DENTAL DIRECTOR NORMAN F. GERRIE*

THE SPECIFIC role of Public Health Service dental officers in a national disaster depends on the nature of the tasks to be done. Before this role may be defined, however, it is essential to analyze carefully the emergency situations with which we may be confronted, and to determine function in accordance with the assigned responsibilities of the Public Health Service and the problems which conceivably may arise in an emergency.

Problems Which May Result from Enemy Attack

Atomic or high-explosive attack upon target cities would produce large numbers of casualties. It may be assumed that the need for medical care of these casualties would reach extraordinary dimensions and require the utilization of all available resources of personnel, supplies, transportation, and housing.

Atomic or high-explosive agents, in addition to producing casualties, could result in the destruction of, or hinder seriously the operation of, normal safeguards for water and waste disposal and other important health services. The loss or impairment of these facilities could cause, in survivors of an atomic or high-exposive attack, diseases which could produce large numbers of casualties from death or morbidity to augment those caused by atomic or high-explosive weapons.

Furthermore, the use of atomic weapons, or the threat of their use, could result in the mass evacuation and dispersal of large segments of the population from target cities. Evacuated populations would tax the health resources of the areas to which they were displaced.

Similar problems may be expected from other forms of enemy attack, such as agents of bacterial, chemical and radiological warfare. The unique character of these agents enhances the likelihood of their employment against civilian as well as military populations. These agents may be employed either overtly or covertly, and may be used independently of atomic or high-explosive weapons. Bacterial warfare, for example, could be employed by an enemy for some time before other more obvious forms of attack were evident.

Considerations in the Selection and Training of Personnel

In order to know that attack has taken place, and to identify its form so that defensive measures may be instituted, it is essential to develop trained and equipped personnel for rapid identification of, and for countermeasures against, obscurely recognizable agents of warfare which might be employed by an enemy, as well as those agents which may be quickly identified.

Problems such as the examples given indicate a need for trained personnel to (a) assist in providing and maintaining the health services which normally protect our population against disease, (b) for the detection and institution of countermeasures against B/W and C/W, and (c) for casualty services. The kind of these problems, and their extent, therefore, determines the need for the number and kind of trained health services personnel required. The ability to meet this need with the existing supply of personnel determines the adequacy of available health resources. Any personnel inadequacies revealed during planning must be recognized as deficiencies in resources, and efforts must be made to supplement these by

* Acting Chief Dental Officer, PHS, Dep't. Health, Education, and Welfare, Washington, D.C. Presented at the Dental Panel of the 62nd Annual Convention, Association of Military Surgeons of the U. S., at Washington, D.C., Nov. 7-9, 1955.

increasing the supply through the training and utilization of additional suitable categories of health personnel.

Casualties produced by whatever means are still casualties, but the training and utilization of personnel must be adjusted to the form of attack. We would not use professional health personnel to prevent an atomic attack; their most efficient use, in this instance, is in the application of their skills after the attack has occurred. Personnel from the health professions, however, may be used to detect, identify and control agents of bacteriological, chemical and radiological warfare, and to prevent and control the spread of diseases resulting from atomic or high-explosive attack and/or mass evacuation, as well as in mass treatment of casualties. It should be noted, however, that measures for dealing with the health problems created by bacterial agents will differ considerably from those caused by agents of warfare with which we are more familiar. The skills required to prevent or minimize casualties produced by B/W agents capable of producing disease in large numbers of individuals are different in many respects from those required for medical care of mass casualties produced by high explosives.

It may be emphasized here that the training of health services personnel for various kinds of emergency situations need not be mutually exclusive. For example, there is no reason why the dental officer should not be trained both for casualty care and for the re-establishment and maintenance of local health services. For each of these problems he has skills to offer. The application of these skills might be made at different times during the course of a disaster, since the need for casualty services does not necessarily occur simultaneously with need for other health services. This concept should considerably extend the usefulness of this category of personnel.

The Role of the Public Health Service Dental Officer in Mass Casualty Care

Up to this point, no specific mention has been made concerning the potential role of Public Health Service dental officers in an emergency situation involving need for mass casualty care.

The majority of Public Health Service dental officers presently on active duty are assigned to Coast Guard duty and to the many hospitals and other stations around the country in which beneficiaries of the Service receive treatment. The role of these Public Health Service dental officers in time of national emergency is, in many respects, similar to that of the dental officer in the Army, the Air Force, and the Navy.

The clinical duties of these dental officers resemble closely those of their counterparts in the other Services, and in time of emergency their functions would be the same. In the performance of these functions, it is anticipated that their primary responsibility would be to provide treatment for military components and legal beneficiaries of the Service; secondary responsibility would exist for care of the civilian population. This priority in responsibility tends to place qualifications upon any provision of medical care services to the civilian population by military personnel.

The accepted concept of mass casualty care in an emergency recognizes that the number of casualties of all kinds will be overwhelming and the need for trained personnel for treatment of casualties will exceed the number available. Consequently, the dentist in civilian life is being trained by means of special courses to act in emergency as an additional skilled pair of hands for the medical treatment of injured.

The potential value of this training has been recognized, and the Federal Civil Defense Administration and the American Dental Association encourage training programs in first-aid and casualty care for civilian dentists through the cooperation of the American Red Cross. In addition, many civilian dental practitioners have received advanced training in techniques of casualty care which have been developed by the military Services.

The Public Health Service agrees with this concept and recommends training in first-aid and casualty service for all dental officers.

Furthermore, at all Public Health Service installations throughout the country plans have been developed for large-scale disaster situations resulting either from peacetime accidents or enemy action in wartime. Emergency teams have been organized which are prepared to go where needed and dental officers are integral members of these teams. Casualty care, then, is an important feature of the role of the Public Health Service dental officer in a disaster.

The Role of the Public Health Service Dental Officer in Public Health Functions

The Public Health Service has accorded a great deal of attention to planning for essential public health services which would be needed in an emergency. As is the case with mass casualty care, it is expected that the need for trained public health personnel would be very great, far exceeding the ability of existing numbers of public health personnel to deal with problems.

Recognition by Civil Defense authorities of the need to develop measures to deal with the manifold effects upon civilian populations of the agents of warfare previously described has resulted in the assignment to the Public Health Service of certain civil defense public health responsibilities which were delegated to the Department of Health, Education, and Welfare by the Federal Civil Defense Administration on July 14, 1954. It should be noted that FCDA retains, and is responsible for, the medical care of civilian casualties resulting from enemy action, although, as has been mentioned, the Public Health Service is preparing to provide assistance where needed.

The specific responsibilities assigned to the Public Health Service are as follows:

"Plan a national program, develop technical guidance for States, and direct Federal civil-defense activities concerned with research with respect to, and detection, identification, and control of, (1) Communicable diseases in humans, (2) biological warfare against humans, (3) chemical warfare against humans, and (4) other public health hazards.

"Plan, develop, and direct Federal activities concerned with a national program designed to provide Public Health Service reserve professional personnel from support areas to those damaged by enemy attack.

"Plan a national program, develop technical guidance for States and direct Federal activities concerned with the emergency restoration of community facilities essential to health or functional components thereof for which the Public Health Service normally has regular operating programs. Plan, develop, and distribute, through appropriate channels, technical guidance concerning the provision of shelter and other protective measures, designed to minimize injury to personnel and reduce damage to vital functional components of . . . hospitals and of water, sewer, and other public health facilities."

This delegation confers upon the Public Health Service responsibility for the recruitment and training of an inactive duty Commissioned Reserve Corps composed of professional personnel to be trained for the restoration and maintenance of normal public health functions in emergency. These officers would be called to active duty only in the event of a national emergency arising from enemy attack, or for disasters due to natural causes.

Under ordinary circumstances, basic community public health services are provided chiefly by physicians, nurses, and sanitary engineers. The Public Health Service commissions not only those categories of personnel but other categories of officers, as well, such as dentists, sanitarians, veterinarians, scientists, pharmacists, dietitians, and therapists. It is to these categories that the Public Health Service is looking for suitable supplementary personnel to assist in the fulfillment of its assigned responsibilities in emergency.

In developing the Commissioned Reserve Corps, the Public Health Service has launched upon a nation-wide recruiting program of considerable dimensions. A considerable number of dentists in private practice have been recruited for the Commissioned

Reserve, and key officers in this group have attended training courses. The ultimate number of dental personnel to be recruited will be related directly to the anticipated needs of the Public Health Service, and this goal has not yet been set pending the development of more precise estimates of needs.

Medical and dental officers for the Commissioned Reserve are being recruited, generally, from non-public health activities, although some are recruited from those engaged in the public health field. Consequently, for the most part, the medical officer or the dental officer comes into the Service with only the basic understanding of public health problems and control procedures obtained in undergraduate training, plus basic training in the sciences. Because of this similarity in pre-Service exposure to the basic sciences and to public health activities, both the physician and the dentist, unless actively engaged in public health work, possess equivalent preparation initially for public health functions in an emergency. Training for public health activities is essential, therefore, for both categories of health personnel.

In time of need the basic public health personnel of physician, sanitary engineer and nurse would be called upon first. If their number is inadequate or they are unavailable, other health personnel, such as dentists, would be called upon to perform appropriate basic health services. In a major emergency, the dentist would not be rendering his usual professional services. His numbers and distribution, however, make him a logical member of the health professions to assist in the provision of other more urgently required health services. The dentist possesses training and competence which afford a potential base upon which to build skills for meeting these health needs. Under disaster circumstances, then, the role of the trained Public Health Service dental officer in the field of public health approaches most closely that of the medical officer.

Summary

Basic similarities exist in the treatment of mass casualties and the provision of public health services in an emergency. Both present overwhelming situations quantitatively and qualitatively, and must be dealt with as expeditiously as possible by methods designed to save the greatest number of lives. In consequence, even as the dentist and the physician are being trained similarly in methods of mass casualty care designed to save the most lives, so are these Public Health Service officers being trained to provide for the basic public health needs of the greatest number of people in time of emergency.

In the fulfillment of its responsibilities in time of national emergency the Public Health Service has recognized the potential contributions of its dental officers, both those on active duty and those in the inactive duty Reserve. The roles of these dental officers have been described and are based upon their capacity to perform essential functions. These functions differ somewhat for dental officers on active duty assigned to Coast Guard and hospital duty, and for Reserve Officers who may be called to duty in an emergency to assist in carrying out the public health responsibilities of the Service. Although the recommended basic Civil Defense training of all dental officers includes medical care of mass casualties, the Commissioned Reserve officers, in particular, are receiving training to equip them for the performance of functions of vital character, the need for which may occur prior to and following atomic or high-explosive attack. It is expected that Public Health Service dental officers will be prepared to perform meritoriously within the scope of these functions should need arise.

Disaster Plan—A Test Run

By

LIEUTENANT COMMANDER E. H. GLEASON, MSC, *U. S. Navy**

ON THE night of 25 April 1956 a disaster exercise, *Operation Hoya,* was held at a Washington, D.C. hospital. The exercise was planned and staged by the Department of Preventive Medicine through the MEND program. The hospital staff had been notified that some time during the two week period 22 April to 6 May, a simulated disaster would be staged to test the effectiveness of the disaster plan. Details of the exercise were kept secret so that the hospital staff would have no inkling as to the date, time, and the type and number of casualties to be expected.

The results were most interesting since they pointed out many important details which are usually overlooked or considered unimportant in planning. These "insignificant" details, that would be typical of a true disaster, caused a major disruption of the carefully designed casualty treatment plans of the hospital during the exercise.

The "disaster" was the simulated explosion of a boiler in the field house of the university gymnasium during a night game. A large number of spectators were reported to have injuries typically associated with such a disaster. These included burns, penetrating wounds of extremities and thorax, fractures, amputations, contusions, and lacerations.

Second-year medical students acted as casualties. Members of the first- and second-year classes of the nursing school acted as anxious relatives and friends. One half of the student nurses had been instructed to make telephone calls to the hospital, beginning about 2040, asking about the welfare of various persons supposed to have been injured. At the same time, each of the remaining student nurses was to go in person to the hospital to locate a boy whose name had been given her on a slip of paper.

The mass casualty plan of the hospital assigned the following areas for the purposes of expeditious handling of the injured:

Lobby—sorting of casualties
Emergency room and doctors' coat room —walking wounded
Outpatient department, 2nd floor, west wing—burns
Outpatient department, 2nd floor, east wing—hysteria
First floor corridor, east wing—nonsurgical fractures
Surgery, 4th floor O.R.—urgent surgery
Departments and offices adjacent to lobby —dead-on-arrival

The exercise proceeded as follows: at 1930 hours, the second-year medical students assembled in the student lounge of the university Medical School, with the various observers. Each "casualty" was marked with skin pencils of different colors to simulate injuries, as follows: black—penetrating wounds; red—burns; brown—open fracture or amputation; green-brown—closed fracture; yellow—contusion; green—laceration. Each casualty was given a slip of paper upon which his simulated wounds were described for his own information, and each had a pad of paper and pencil to record the following data:

1. Time of arrival at hospital.
2. Time seen by doctor.
3. Diagnosis established.
4. Treatment given.
5. Was treatment adequate?
6. Comments on efficiency.

At 2025, the hospital switchboard was informed by telephone that a disaster had occurred at the gynasium and was instructed to stand by to receive casualties. At about 2040, the first casualties arrived at the lobby

* Preventive Medicine Division, Bureau of Medicine and Surgery.

entrance and were followed at frequent intervals by more casualties. The screening staff were assembled and lost no time in getting to work making the diagnoses and filling out a mimeographed *Emergency Medical Record.* From the lobby, casualties were escorted or carried to the predesignated areas.

Within a very few minutes of the arrival of the first casualties, telephone calls from the nurses began to flood the switchboards. The three operators did a superb job of keeping up with the calls, although the flashing call-lights resembled a myriad of fireflies. Between responding to the switchboard and covering the public address system, the chief operator was as busy as one person could be. At the same time, the flood of "relatives" made their appearance on the scene. From this point on, the scene is best described as complete pandemonium. The "distraught relatives" swarmed all over the hospital, personnel, and patients, completely disrupting proceedings. Many became "hysterical" and were bodily carried out the front door, only to reappear in the emergency rooms within a few minutes.

The general melee was further confused by a student simulating a violent psychosis in addition to a wound. Four orderlies were required to force the screaming "patient" to the second floor, east wing, where he was supposedly sedated, but was left unguarded and was not seen by a doctor. Before long he appeared on the first floor to again and again confuse the exercise. Later, a hysterical patient appeared and added to the disruption of the exercise.

Plans called for the casualties to enter through the lobby for screening, and no provision had been made to close off other entrances. As a result, some casualties entered the emergency entrance. Because of the confusion caused by distraught relatives and the general milling around of the walking wounded, the nurses, and the orderlies who were helping, some of the patients who entered through the emergency entrance were not seen by a doctor for over an hour. In the confusion, attendants forgot the temporary morgues, and the dead-on-arrival—as well as those who died later—were placed along the corridors.

Blood-bank and X-ray services were the only services that were not more or less completely disrupted. These two services handled their problems proficiently, probably largely because they were physically located away from the area in which most of the confusion existed. The Fourth Floor Urgent Surgery was overloaded with patients and relatives, whereas many of the operating suites were devoid of patients as well as of hospital personnel.

The outpatient department, 2nd floor, west wing, was designated to handle the burn cases. The casualties were deposited in the corridor for treatment, but the dim lights available made examination almost impossible and emphasized the need for more adequate lighting of all areas which may have to be devoted to the care of mass casualties.

The nurses, nurses' aides, sisters, and priests were all assembled and standing by for use as needed. It occurred to me that the indoctrination of this ancillary staff would have alleviated much of the problem caused by "relatives" both from the standpoint of keeping them away from the working areas and in obtaining information for them.

Due to the confusion, a complete count and roster of the casualties were not obtained.

All observers agreed that Operation Hoya was a complete success in that it thoroughly tested the effectiveness of the hospital disaster plan and revealed weaknesses in a most graphic manner. While there was a great deal of confusion during the exercise, as was anticipated, there was a remarkable amount of effective work accomplished by the hospital staff.

This observer was particularly impressed with the fact that all casualty plans should include the following provision if weaknesses such as were encountered in Operation Hoya are to be avoided:

1. As soon as the hospital is alerted for

a disaster, guards should command all entries to route casualties to the screening team and to admit *authorized personnel* only, thus permitting an orderly flow of traffic.

2. The screening area should be so located as to permit doctors to work without being interrupted by the arrival of new casualties.
3. Plans must be complete for the control of hysterical or psychotic casualties, both wounded and unwounded, in order to avoid unnecessary confusion.
4. All hospital personnel, including associate and assistant personnel, must know their stations and assignments.
5. Nurses, nurses' aides, and other adjunctive personnel should be utilized to the greatest extent to free the doctors for the more urgent cases and the orderlies for those cases requiring special handling.
6. Areas designated as "emergency treatment areas" should be provided with adequate light to permit thorough diagnoses.
7. After preliminary screening was completed and casualties were directed towards treatment areas, it appeared that much time and confusion would have been saved if the casualties had been again screened as they arrived at the treatment area. For example: sucking chest wounds and other more serious wounds could be sent to immediate surgery, and less urgent cases, such as amputations, could stand by for a short time.

Observation of the disaster experience leads the author to conclude that such realistic exercises conducted at unscheduled times is one of the best possible methods to point up the exigencies of such an emergency, to detect flaws in disaster plans, and to train the staff of a hospital in disaster procedures. Among the stronger impressions gained by other medical observers during the exercise were: (1) the medical profession has a strong interest in disaster medicine, and needs only some definite programming; (2) any paper disaster plan badly needs a trial run in order to find the weak points; and (3) everyone who participates in such an exercise becomes a missionary to the cause.

Note: This test was done at the Georgetown University Hospital, Washington, D.C.

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Military Chiropody Today

By

C. R. BRANTINGHAM, *D.S.C. Lieutenant, U. S. Navy Reserve*

THE present day chiropodist is far removed from the traveling mendicant who used to minister to the foot ills of Americans when this country was young. The term chiropody was first used in 1768 by an Englishman who wrote a treatise entitled "Chiropodologia." A synonym, podiatry, is used in two states and in the Navy, which has established a Podiatry Section of the Medical Service Corps. Prior to 1912, chiropodists secured their training through the preceptorship system. The modern chiropodist receives his education in one of six recognized schools (some university-affiliated) which are qualified by the United States Office of Education, Higher Education Division. The degree D.S.C. (Doctor of Surgical Chiropody) is conferred after a candidate meets certain requirements. Two years of pre-chiropody college training now precede the four years required since 1937 by the National Association of Chiropodists. The four-year chiropody college course consists of 4,400 hours or more in classrooms, laboratories and clinics, and covers the subjects of anatomy, physiology, embryology, histology, pathology, bacteriology, bio-chemistry, neurology, dermatology, physical therapy, roentgenology, orthopedics, orthodigita, podopediatrics, surgery, materia medica, therapeutics, physical diagnosis, and didactic and clinical chiropody. Internships are offered in hospitals and clinics. The modern chiropody college is closely allied with a medical school, and in many instances members of the faculty teach at both the medical and chiropody school.

Modern chiropody serves an increasing public and medical need. Yet, Locke[1] writing in the *Journal of the Medical Society of New Jersey*, says, "The average physician probably knows less about the profession of chiropody than he does of any other branch of medicine." Recent studies indicate the need for closer cooperation between medical doctors and chiropodists. Rubin Friedman, M.D., Clinical Professor of Dermatology, Temple University School of Medicine, states[2] "Disorders of the feet occur in eighty per cent of women and in sixty per cent of men. Few practitioners of the healing arts are as familiar with the almost infinite number and variety, as well as the significance of the signs and symptoms and diseases of the pedal extremities, as is the chiropodist. Once he is engaged in active practice, the chiropodist sees more patients suffering from one form or another of diseases of the foot, than does any practitioner of medicine."

Though the need for chiropody services is at once obvious, Marwell and Brantingham[3] did some interesting research on the subject. They found that during World War II, "Among male personnel, 17.6 per cent of all dispensary visits were for complaints referable to the feet. Among female personnel, 52.3 per cent of the dispensary visits involved the feet, and that of 1,647 female recruits (Waves) who had passed the physical examination required for enrollment, only 246 or fifteen per cent were found to have normal feet."

The American Medical Association[4] has recognized that chiropody fills a gap, and does not use or teach cultist methods.

The Canadian Medical Association Journal[5] in *Editorial Comments* regarding the place of the chiropodist, states (the chiropodist is), a trained professional man with professional and ethical standards like our own. He specializes as does the dentist in a limited field of the body. Acceptance of the value of the trained chiropodist is long overdue." The foregoing statements, then, are characteristic of close medical experience with modern chiropody.

Many of the largest and best known hospitals in the United States have chiropody

services, and would not be without them. The Commissioner of Hospitals, City of New York,[6] states that "chiropodists serve on the staffs of forty hospitals in New York State and in about a thousand throughout the country." This affiliation has been a deliberate growth based upon an esteem by Doctors of Medicine who have become familiar with chiropody.

In 1947, authorities at Vancouver General Hospital became interested in establishing a chiropody service. Letters were directed to 250 American hospitals. The Medical Board of Vancouver General Hospital[7] received replies typical of the following: Elliott P. Joslin, M.D., New England Deaconess Hospital, Boston, "We have had a chiropody department upwards of 20 years"; Melvin S. Henderson, M.D., Mayo Clinic, Rochester, "We have had a chiropodist here since 1926. Such a section of the orthopedic department has been of great help"; Julian Priver, M.D., Mount Sinai Hospital, New York, "We have had a podiatrist associated with each of the following clinics—Metabolism, Peripheral Vascular Diseases, and Orthopedic. My reaction is that (chiropody) is a vital adjunct in the rendering of a comprehensive medical service. The care of the feet is a subject that has been greatly neglected by the medical profession, despite the fact that poor foot hygiene causes marked morbidity and economic loss to the patient. A well controlled, well staffed (chiropody) service is a valuable asset to any medical institution."

Through experience and training, the chiropodist is particularly equipped to help those with peripheral vascular diseases. Allen, Barker, and Hines,[8] in their book, *Peripheral Vascular Diseases,* make valuable use of this knowledge, for a section of this book is written by an eminent chiropodist. Preventive foot care has been shown to result in fewer infections in this field. One such study displayed that scrupulous chiropodic prophylaxis improved the prognosis of foot infections by 77 per cent. Joslin[9] indicates that chiropody is necessary in all such patients, and Gray[10] states that gangrene and subsequent amputation is greatly reduced by this service. A study by Arenson[11] at the Los Angeles County Hospital revealed that the chiropody clinic reduced diabetic ward admittances to such an extent that it made available the equivalent of a 22-bed ward each day of the year. Over a three-year period, this amounted to a cash economy of $98,649.20 per year.

The vast new field of chiropody service to industry is only now becoming a reality. The salvaged man-hours and improved working capacities are direct results of chiropodic rehabilitation. This care requires special skills, and instrumentation developed by modern chiropody. MacDermat[12] says, "Success in the care of foot disabilities requires detailed, meticulous, often daily care, which can best be given by one who devotes himself entirely to this work." A current report in *Nations Business*[13] states, "Foot fatigue costs American business and industry $125,000,000 a year in ruined sales, lowered employee morale, and plant accidents."

Filene's Department Store in Boston has a chiropodist check weekly on employee's foot complaints. A similar program at Woodward & Lothrop in Washington has shown extraordinary results. One of the most significant achievements in the field of industrial foot health has been made at Fulton Bag and Cotton Mills in Atlanta.[14] There, an industrial chiropody clinic is operated in the medical clinic for all workers. The result is a dramatic decline in absenteeism and a surge in productivity. One survey reported thirty important companies employing a full-time chiropodist.

Today, chiropody meets a public and medical need. The specialty remains a definite unit of medically trained practice with known obligations to the parent body. Thus, it is fitted to fulfill the increasingly urgent need for foot care demanded by today's civilization. It is in the interest of the general public that there be closer cooperation between chiropody and medicine. The modern chiropodist seeks that cooperation in promoting the foot health of the nation.

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Safety Precautions in Operating Rooms

By

MAJOR RICHARD E. GREEN, MC, *U. S. Army**

THE purpose of this paper is to re-emphasize the problem of safety precautions which should be observed in all operating pavilions throughout the command. Operating room explosions and fires are an ever-present hazard, but because they are fortunately infrequent, the possibility of their occurrence is sometimes forgotten and the usual safety precautions may become lax. The enforcement of certain basic operating room regulations, the use of warning signs, the holding of safety conferences and the teaching of established disaster procedures will assist in keeping all operating room personnel constantly aware of the possibility of an explosion disaster, of means to guard against it and also how to meet it, should it occur.

BASIC FACTS OF FIRE AND EXPLOSION HAZARDS

Attention is called to two basic facts which must be recognized. The first is that: *explosions are not likely to occur unless an explosive mixture is escaping into a room.*

It follows, then, that the equipment for anesthesia must be kept in the best of repair. Worn or leaky equipment must not be used. The flowmeters of those anesthetic machines which are capable of measuring fine flows of gas depend upon sensitive control valves. Personnel should never, in an effort to insure against gas leakage, turn these valves off energetically like radiator valves. By doing so they may score the valve stem and injure the valve seat. Such injuries will promote the development of gas leaks. Personnel should only turn off the control valve on an anesthetic machine to the point where the flowmeter no longer registers a flow of gas.

The gas cylinder valve, on the other hand, is constructed in such a manner as to accept a forceful twist of the key. It should be tightly turned off to prevent leakage. Leaks which develop around the cylinder valve stem frequently may be controlled by tightening the hexagonal nut of the packing gland. One should tighten the locking nut only when the valve is turned off. Cylinder valve leaks can often be overcome temporarily by opening the valve stem as far as it will go. If, in spite of these simple measures, a cylinder valve leak persists, the cylinder should be plainly marked "DEFECTIVE VALVE" and returned to the manufacturer. Gas cylinder valves of the diaphragm-type are less likely to leak. If they do, they should not be tampered with but returned at once for repair.

The second basic fact of fire and explosion hazards is that: *Any room in which an explosive anesthetic agent is being used is potentially hazardous, regardless of mechanical safeguards or regulations.* There can be no excuse for failure to take every precaution.

SPECIFIC FIRE AND EXPLOSION HAZARDS

Considerable risk is attendant to the use of combustible anesthetic agents, i.e., cyclopropane, divinyl ether, ethyl chloride, ethyl ether and ethylene, because these agents form flammable mixtures with air, oxygen or nitrous oxide. The use of closed rebreathing systems for the administration of anesthetic agents normally tends to restrict the region likely to be hazardous. To secure a reasonable measure of protection, however, it is necessary to apply certain basic safeguards in any room in which these agents may be used.

The principal sources of possible ignition of combustible anesthetic agents in anesthetizing locations include the following: fixed electrical equipment; portable electric equipment; static accumulation; open flames and

* From the Surgical Service, U. S. Army Hospital, APO 403, New York.

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heat above ignition temperature of gases in use; percussion sparks; spontaneous ignition of gases in use.

Ether and tinctures of disinfecting agents are combustible. If personnel tip over vessels containing these agents, spill or pour excessive amounts on patients, they expose these agents to ignition.

If a connection between two points of an electrical system which are different electrical potentials includes the body of a person, he is likely to suffer an electric shock. If a connection between two points at different electric potentials is made by metallic conductors, there is likely to be a spark or an intense heating of one or more of the metallic conductors. Safeguards against one of these hazards are often effective against the other.

Ignition of flammable gases by electrostatic spark discharge is a hazard of great significance. Electrostatic charges can set up dangerous potential differences only in the presence of materials which are electrically non-conducting, i.e., insulators which act as barriers to the free movement of such charges and hence prevent equilization of potential differences. A spark discharge can take place only when there is no other path of greater conductivity available by which this equalization may be effected.

An obvious and, hence, less frequent cause of the ignition of flammable anesthetic agents is by open flame or by hot materials heated to or above the ignition temperature of the agent.

There are two possible approaches toward effecting a reduction in operating room explosions. One is by eliminating the combustible agents. The other is by elimination of the ignition source. It is at once apparent that neither of these approaches is entirely practical.

Existing circumstances must guide the approach to the problem. For instance, the open flame ranks very low as an ignition source in a civilian hospital. This source, however, would attain considerable importance in a hospital operating in the field. In many cases the elimination of combustible agents and substitution of other anesthetic agents would present a greater risk to the patient than the risk of fire or explosion, even though safety measures to prevent fire and explosion were entirely disregarded. The extensive use of regional and spinal anesthesia, for example, would appreciably reduce the danger of fire and explosion. This would be a simple way of reducing explosion hazards, but the use of such anesthesia involves complexities in the training of medical officers proficient in their administration. This form of anesthesia also presents certain other disadvantages unrelated to fire or explosion. The proper care of the patient is the foremost consideration, and this must take into account the training of the anesthetists, the equipment and agents available, the existing circumstances and the condition of the patient. Emphasis on spinal and regional anesthesia should not be construed as a recommendation to avoid combustible anesthetics. Under no circumstances should the fear of explosion encourage the employment of spinal anesthesia by the unskilled operator or of pentothol over-dose as a substitute for ether anesthesia.

To approach complete success in the prevention of anesthetic explosions, all persons —the surgical staff, the nursing staff, the maintenance staff and administrative personnel—must be educated as to, and periodically reminded of, the explosive nature of combustible anesthetic agents.

Recommended Safeguards Against Fire and Explosion

Studies of the hazards of igniting flammable mixtures of combustible agents and of electrical shock from power and lighting circuits lead to the conclusion that the greatest degree of safety possible, with our present knowledge, can be secured by coordinated action only on the basis of all significant facts rather than by the application of individual and unrelated safeguards. Therefore the following recommended standards for certain features of the construction and arrangement of operating rooms, delivery rooms and other places of surgical treatment, as well as for the performance, installation,

maintenance and use of equipment therein have been drawn up:

1. A room for storage of combustible anesthetic agents must be considered a hazardous location throughout and be treated accordingly. All such rooms should be individually ventilated, the air should be exhausted by gravity from the room to the exterior at the rate of not less than two changes per hour. Separate cylinder storage rooms should be provided for flammable and oxidizing gases and should be constructed of fire-resistant material.

2. Mechanical ventilators should be installed in the operating and delivery rooms for the comfort of the persons in the room, as well as for possible reduction of air-borne bacteria, removal of odors, reduction of the hazard of gross spillage of combustible anesthetics and as a convenient means of introducing humidity.

3. Piping systems must not be used for the distribution of combustible anesthetic gases.

4. To prevent accumulation of dangerous electrostatic charges, the surface of the operating room floors should provide a path of moderate electrical conductivity between all persons and equipment making contact with the floor. Operating tables and anesthetic equipment must be grounded.

5. All furniture should be constructed of metal or of other electrically conductive material. Surfaces on which movable objects may be placed should be without paint, lacquer or other insulating finish. Casters, tires or leg tips should be of metal or conductive rubber.

6. All rubber sheeting, the covering of all operating tables and stretcher pads and of all pillows and cushions should be fabricated from sheeting of conductive rubber or equivalent material.

7. All rubber or equivalent parts of operating room equipment should be of conductive rubber or equivalent material unless the objects to which they are fastened are connected electrically. All equipment should be of conductive materials where possible.

8. If conductive flooring is not available, the use of an intercoupler system, including the patient, the anesthetist and anesthetic equipment, is suggested as an alternative. However, conductive flooring is the ideal.

9. Hospital personnel must realize that smoking, open flames, hot materials, photoflash bulbs, cautery equipment, x-ray machines, high frequency devices and other electronic equipment such as amplifiers and recorders introduced into the area of combustible gas accumulations create an added hazard.

10. It is recommended that residual ether left in ether vaporizers at the end of the day be disposed of in an appropriate manner. Ether jars should be rinsed out, and wicks should be rinsed and dried.

11. When in the course of an operation being performed under anesthetic with a flammable agent it is considered imperative that the electrosurgical unit be employed, the risk of ignition will be considerably reduced by the liberal application of wet towels around the face mask. This will be in addition to the regular check of all points of contact, slip joints and rubber parts to insure against gas or vapor leaks.

12. Outer garments, blankets or sheet covers of wool or containing wool must be excluded from anesthetizing locations. Personnel entering these locations must not wear fabrics of silk, rayon, nylon, dacron, sharkskin, etc., as outer garments, for hosiery or for any other non-approved purposes. Outer garments, as well as any slips or stockings worn by personnel, should be of cotton.

13. Covers should never be used on anesthetic equipment.

14. Gum rubber or rubber-sole shoes should not be worn by personnel. Shoes with plain leather soles and insulating devices are recommended. Cotton boots, moistened, may be worn if so desired.

15. All mobile equipment should be grounded by a conductive type caster. Metal wheels must be kept clean or they are nonconductive.

16. The so-called hazard zone extends 5

feet above the floor; therefore, any equipment used which is not explosion-proof, must be placed above this level to be safe. Electrical outlets below this level must be spark-proof.

17. No electrical equipment except that furnished or approved shall be used in any operating room where combustible gases are in use.

18. High humidities are helpful in anesthetizing locations but are no guarantee against static sparks.

19. "No Smoking" and other appropriate signs should be posted in conspicuous places.

These recommendations outline, in some detail, ways and means for eliminating hazardous conditions which experience and investigation have shown contribute to to the hazards of fires and explosions in operating pavilions. In applying these recommendations it is necessary to understand fully the nature of these contributory conditions and their relations to the hazards in question.

REFERENCES

Recommended Safe Practice for Hospital Rooms National Fire Protection Association—1954 (NFPA #56)

Safety in Hospitals
Ohio Chemical Surgical Equipment Co.

Communication from Harvey C. Slocum, Col MC, Consultant to the Surgeon General in Anesthesiology, to Professional Services Branch, Medical Division, USAREUR, dated 16 Feb 1955

Communication from Wm. B. Neff, Lt Col MC, formerly USAREUR Consultant in Anesthesiology

REMARKS BY THE HONORABLE WILBER M. BRUCKER, SECRETARY OF THE ARMY, PEORIA ASSOCIATION OF COMMERCE, PEORIA, ILLINOIS, MAY 15, 1956

We must not permit ourselves to be deceived by Soviet duplicity, or lulled into a state of complacency by the Kremlin's latest switch—its denunciation of Stalin. The smashing of the Stalin idol is in itself a matter of little consequence. It is more important that the Soviets appear to be returning to the "pure communism" of Lenin, and rededicating themselves to his thinking and theories. It was Lenin who told his followers that "It is absolutely necessary for every Communist Party systematically to combine legal with illegal work, legal with illegal organization." He also reminded his fellow communists that "Everything that helps the revolution is good." It follows that the use of deceit, sabotage, assassination, terror, and defamation are all "good" in the communist book. These are the everyday tools with which the Kremlin hopes to fulfill its boast that this century will mark the triumph of communism.

The Medical Plan

By

LIEUTENANT COLONEL SPURGEON NEEL, MC, *U. S. Army**

ONE OF the major continuing responsibilities of the staff surgeon, regardless of his rank or the echelon of command represented, is planning. Good medical service does not "just happen." Planning never ceases. The effective surgeon must remain constantly abreast of the situation, and plan the medical support for the next phase of a given operation, while supervising the medical support of the current phase. Those surgeons who also command medical units have a dual planning responsibility. The format and principles involved in preparing a medical unit plan are clearly prescribed in appropriate field manuals. The principles, format and procedures involved in the preparation of the medical support plan are less clear and merit further consideration.

An understanding of certain basic definitions facilitates formal planning.

A *plan* is a detailed statement of the course of action to be followed to attain a desired result. It is the basis of orders. A plan, either mental or written, must precede execution of any military task.

An *order* is a communication, written or oral, which conveys instructions from a superior to a subordinate. A plan which is approved and ordered executed constitutes an order.

An *annex* is a document appended to an operation order or other document to make it clearer or give further detail. It contains information necessary to amplify an order when the application of such information is limited or technical.

An *appendix* is supplemental material added to an order, annex or other document. Its scope is similar to that of an annex, and it is often utilized to amplify an annex. If further amplification of an appendix is desired, inclosures are utilized. Examples of the above documents will be given in the detailed discussion of the medical plan.

A Standing Operating Procedure (SOP) is a set of instructions giving the methods to be followed by a particular unit for the performance of those features of operations, both tactical and administrative, which the commander wishes to make routine. These procedures are normally derived from past experience. Proper application of such instructions reduce both the number and complexity of orders which must be issued.

All military plans, including medical, should possess certain basic characteristics. Certain of these characteristics must be balanced with others, but that plan representing the best compromise of the following desirable features is the most likely to be effective.

A plan must be *sound.* Based on adequate information, analyzed by experienced personnel, the plan must provide the maximum in efficiency with the utmost economy in means. The course of action selected and the responsibilities assigned in the plan must represent the best manner of assisting the commander in the accomplishment of his mission.

A plan must be *complete.* It should anticipate and answer in advance questions which subordinate commanders may raise. Completeness must not be sacrificed for the sake of brevity. In the case of major commands, fragmentary plans disseminated in the interest of concurrent planning to save time, should be supplemented as rapidly as possible with a complete plan to give each subordinate a clear picture of what he and those about him are expected to accomplish.

* Walter Reed Army Institute of Research, Washington 12, D.C.

A plan must be *simple*. The test of any plan is its execution. Avoid complicated plans. Give the subordinate his mission, provide him with coordinating details, and let him work out the methods for execution. Maximum use of SOP's will contribute greatly to the simplicity and brevity of subsequent plans.

A plan must be *brief*. Commanders are busy people. The plan should include only those details necessary for implementing the commander's decision. Supplemental details of limited or technical interest may be attached as annexes or appendices. Brevity, plus use of an established format, will save valuable time in searching for information and instructions.

A plan must be *flexible*. It must be capable of modification as necessary to meet changes in the situation. It should provide reserve means sufficient to cope with new exigencies as they arise. This characteristic accentuates the requirement for simplicity. Simple plans, understood by all, lend themselves to sudden change much better than elaborate highly complicated plans.

A plan must be *timely*. It should be formulated in sufficient time to permit coordination with other members of the staff and approval of the commander. It must be made available to subordinates in sufficient time to permit formulation of adequate implementing plans. Information and decisions may be disseminated in a fragmentary manner to provide subordinates more time for detailed planning. The actual time required to prepare a plan depends upon the echelon of command.

The procedure for planning follows a normal inductive sequence. Information is a prime prerequisite. The surgeon secures a portion of the required information from the operations plan as amplified by instructions from general and other special staff officers. Technical information is normally available in instructions prepared by surgeons of higher echelons and appropriate Department of the Army publications. Subordinates constitute a valuable source of detailed information. A map reconnaissance, followed by a detailed ground reconnaissance to the extent possible facilitates accurate planning.

Based on all available information, a *medical estimate of the situation is* made.[1] Medical requirements are determined. Medical tasks in support of the tactical operation are evolved. If it becomes obvious that additional medical resources will be required, the next senior surgeon is notified of the requirements. After determining the nature and extent of the medical problem, the procedures to be followed, and the requirements for additional medical support, the final stage is the fixing of responsibility for medical functions and services. This is done by considering the resources available to each subordinate commander and the tasks to be performed. The statement of medical policies and the specific fixing of responsibilities for medical functions is the form in which the medical plan is usually presented.

The importance of concurrent planning cannot be overly emphasized. Due to the requirement for early advance planning as the situation is developed, and the fact that subordinate surgeons will require time to prepare their own plans, it is essential that information and decisions be made available to subordinates as the major plan is developed. Often, by the time the final plan is published, all of its contents will have been disseminated.

Standing Operating Procedures (SOP's) are designed to save time and effort. Each commander or staff officer should constantly revise the SOP of his unit or section, incorporating all matters which he desires to make routine. Published plans and orders should refer to SOP's whenever it is practicable to preserve brevity and clarity in the body of the document. It should be remembered, however, that newly assigned or attached units (characteristic of medical task organization) may not be familiar with the SOP's of the parent organization. Such units should be oriented immediately and provided copies of current SOP's.

The tactical commander's operation plan is the basic military plan. It is the document

upon which supporting plans are based. Amplifying documents (annexes and appendices) follow the format of the plan to which appended. The format of the operation plan is prescribed by the Joint Chiefs of Staff, and is applicable to all military services. Such a standard format is valuable to both those preparing or reading a plan. It saves time, promotes understanding, and precludes errors of omission. Its format and sequence is valuable in the preparation and dissemination of all military plans, whether oral or written, complete or fragmentary.

The logistics plan, frequently an annex to the operation plan, contains pertinent logistical information for the support of the operation. It is prepared concurrently with the operation plan as rapidly as the necessary information and decisions become available. The logistics plan may be in considerable detail, containing all pertinent logistical information; or it may be quite brief, referring to appropriate technical and administrative appendices. In the logistics plan, each component of logistics is normally given a separate paragraph rather than grouping all logistic matters in one paragraph as in the case of the operation plan. This is indicated due to the fact that, in all military planning, logic supersedes orderliness. The logistic plan is frequently combined with the personnel plan and published as the administrative order of the command. The logistic plan may have appended an overlay and one or more technical service appendices.

The medical plan may be one of the appendices supporting the logistics plan. It contains technical information of primary interest to commanders of subordinate medical units, or surgeons of subordinate commands. Medical plans are not commonly formalized or written below the field army level. They may, however, be prepared in considerable detail, even at division level, prior to a special operation such as an amphibious or airborne assault. Regardless of whether the plan is written in detail or published or not, each surgeon should go through the planning procedure to insure that all pertinent matters are covered.

A standard format for the medical plan is of value as a check-list when arranging the medical support for any type of military operation, tactical or administrative. An ancillary reason for the "lower-level" surgeon's understanding of the format of the medical plan is that he may rapidly find required information in the medical plan of higher headquarters, even under the pressure of a tactical situation.

Figure No. 1 presents a recommended format for a complete formal medical plan. It is in consonance with the prescribed format for the operations plan and the accepted format for the logistics plan. It is equally applicable to medical planning at all echelons of command, or in any type of military operation, whether tactical or administrative. While not obligatory nor restrictive in any way, it is an orderly, logical consideration of all phases of medical activity. It is recommended as a check-list for all who participate in medical planning.

The proposed format is rather lengthy and all-inclusive. Planners should consider it only as a guide or check-list, and use only such portions as are applicable. Inappropriate paragraphs may be omitted entirely and subsequent paragraphs numbered accordingly. Administrative details included may require modification to meet the procedures prescribed by the headquarters doing the planning. The security classification will be as designated by the headquarters concerned and placed at the top and bottom of each page.

The heading of the plan is self explanatory. The designation of the plan will vary with the nature of the document to which it is attached. Numbers or letters will be designated by the headquarters in its "plan for planning." Maps listed should include sheets involved when reference is made to location by map coordinates. Otherwise, this portion of the plan is omitted.

The medical task organization is normally not included unless the document is the initial medical plan of the command, or a major reorganization is to be effected. If the medical task organization is lengthy, it

FORMAT FOR THE MEDICAL PLAN

CLASSIFICATION

Headquarters
Location
Date and Time

Appendix .... (Medical) to Annex .... (Logistics) to Operation Plan .....
Maps: (Only if plan refers to locations by map coordinates)
Task Organization: (Initially and in event of major reorganization)

1. *General Situation.* (Information essential to understanding of plan)
   a. Enemy forces. (Emphasis on capabilities bearing on plan)
   b. Friendly forces. (Emphasis on medical support functions and responsibilities of higher and adjacent headquarters)
   c. References. (Directives, other than DA, which amplify the plan)
   d. Assumptions. (Minimum required for planning purposes)
2. *Mission.* (Statement of over-all medical mission and controlling policies)
   a. Mission. (Separate subparagraph for each component to which varying degree and type of medical service is provided)
   b. Policies and procedures. (Broad statements covering principles on which plan is based. Those necessary for understanding)
3. *Tasks for Subordinate Units.* (Major tactical commands only)
   a. Separate subparagraph for each major subordinate tactical command.
   b. (Technical missions for operating medical units covered later)
   c. Instructions applicable to two or more subordinate tactical commands.
4. *Supply.* (Refer to SOP to extent practicable)
   a. General supply. (Special instructions applicable to medical units)
   b. Medical supply. (Special procedures applicable to this operation).
      (1) Requirements. (3) Storage.
      (2) Procurement. (4) Distribution.
   c. Salvage of medical equipment and supplies. (SOP)
   d. Captured enemy medical supplies. (SOP)
   e. Civilian medical supplies. (SOP)
   f. Units and installations. (Separate sub-subparagraph giving locations, missions, hours of opening and closing and troops supported for each medical supply unit or installation. Covers medical maintenance activities if properly attached).
   g. Other medical supply matters.
5. *Evacuation and Hospitalization.* (Refer to SOP whenever practicable)
   a. Evacuation.
      (1) Evacuation policy. (By phase of operation if indicated)
      (2) Other components. (Policies regarding evacuation of Navy, USAF, civilians, Allies and POW's as indicated)
      (3) Requirements. (Estimate of requirements by type)
      (4) Units. (Separate sub-subparagraphs giving locations, missions and attachments as indicated)
   b. Hospitalization.
      (1) Policies. (Hospitalization of other military components, civilians, POW's etc.)
      (2) Units and installations. (Separate sub-subparagraph for each hospital, giving locations, missions, hours of opening and closing, troops supported and attachments as indicated)
6. *Transportation.* (Cover medical use of nonmedical transportation)
   a. Policies. (Policies regarding use of evacuation means not under medical control.)
   b. Highway (Transportation)
   c. Rail (Transportation)
   d. Water. (Inland and/or ocean)
   e. Air (Nonmedical Army, Air Force and Navy)
   f. Procedures. (Refer to SOP whenever practicable.)
7. *Service.* (Refer to SOP. For medical units, give locations, missions, troops supported, and hours of opening and closing).
   a. Service to medical installations. (Include laundry, bath, utilities, fire-fighting, construction, real estate, etc.)

b. Medical equipment maintenance. (Unless included under supply)
c. Dispensary service.
d. Psychiatric service.
e. Dental service. (Include both service and prosthetic units. There is usually no separate dental support plan)
f. Preventive medicine service. (May refer to current sanitary order)
g. Aviation medicine service. (Or other service provided by special teams)
h. Medical intelligence.
i. Veterinary service.

8. *Miscellaneous.* (Refer to SOP)
a. Personnel. (Specific instructions for this operation)
b. Defense. (SOP)
(1) Unit defense.
(2) Sector defense.
(3) Sector damage control.
c. Special medical reports. (Those not prescribed in SOP)
d. Other medical matters.

.....
COMMANDER

Inclosures:
Distribution:
Authentication:

CLASSIFICATION

NOTE: Use as format or as check-list. Varies with procedure of command.

is frequently attached to the plan as an inclosure. The command structure reflected in the medical task organization is important for it is the basis for missions. Should attachments be for limited administration or control, this should be indicated.

Paragraphs 1, 2 and 3 of the proposed format normally do *not* appear in the medical appendix to the logistical annex to the operations plan. However, they are a part of the normal inductive sequence in developing the medical plan and should be given cognizance. In publication with elimination of these three paragraphs, subsequent paragraphs are renumbered and correspond with the paragraphs of the logistics (administrative) plan (order).

Paragraph 1 gives the general situation, including that information on which the plan is based and that which is of value to subordinate commanders of medical units. Reference may be made to an appropriate intelligence annex in the interest of brevity, but it is proper to repeat for emphasis such information which is of definite medical importance. Those enemy capabilities having a direct and specific bearing on the medical plan should be given. The medical responsibilities of higher and adjacent units are included. References which serve to amplify the medical plan are listed. This preserves brevity by avoiding the repetition of lengthy data which is already available in other publications. Assumptions are limited to those factors which are unknown and beyond the control of the commander. Assumptions are progressively confirmed or eliminated as planning progresses. No plan is any better than the validity of its assumptions.

Paragraph 2 states the over-all *medical* mission of the command. Appropriate subparagraphs describe specific medical responsibilities toward each category of personnel, i.e. assigned troops, allied troops, civilians, POW's, etc. Types of medical support by category, i.e. supply, evacuation, hospitalization, service, etc, should also be included. This is the basis of policies and procedures contained in the remainder of the plan. General policies and procedures under which the plan is to be executed are included as the second major portion of this paragraph. They contribute to over-all understanding of the plan.

Paragraph 3 indicates specific *medical* responsibilities of major subordinate *tactical* commanders. Each major tactical commander has certain medical responsibilities. These responsibilities normally reflect the medical means available to the commander. Tasks for *medical* units are not listed in this paragraph, in that they are more appropriate for succeeding paragraphs devoted to types of medical service. Normally, a separate subparagraph is devoted to each major subordinate tactical command, and the last subparagraph, denoted as "x" lists those responsibilities common to two or more of the major tactical units.

Paragraph 4 (frequently cross-referenced with paragraph 1 of the administrative order, and frequently paragraph 1 of the *published* medical appendix) contains instructions regarding general and medical *supply*. The general supply subparagraph is concerned with appropriate instructions to medical units regarding such matters as supply priorities to medical units, handling of hospital rations, special distribution instructions for medical units, etc. The medical supply subparagraph includes instructions applicable to the specific operation. Appropriate reference to the SOP will simplify and abbreviate this subparagraph. All aspects of medical supply procedure are considered. Missions and associated instructions for medical supply units and installations, to include locations and hours of operation, are included.

Paragraph 5 (usually paragraph 2 of the published plan) is concerned with *evacuation and hospitalization.*

The *evacuation* subparagraph usually begins with the statement of the evacuation policy (in days) of the command. In complicated operations, such as amphibious and airborne assaults, this policy is given by phase of the operation. The evacuation responsibilities of the command toward other military components, POW's and civilians, are included as applicable. To assist higher and adjacent planners, an estimate of the evacuation requirements may be included. In such cases, specific data as to types of evacuation is included. A separate subparagraph is devoted to the mission of each major subordinate evacuation unit.

The *hospitalization* subparagraph relineate the specific hospitalization responsibilities of the command for this particular operation. Hospital locations, attachments (unless shown in the medical task organization) and missions are prescribed. Should a hospital be in direct support of a specific tactical unit, that fact is stated. If the mission is completely normal, it is necessary only to list and locate the hospital.

Paragraph 6 (Usually paragraph 3 of the published plan) is headed *"Transportation."* It includes instructions for the use of nonmedical transportation in a medical support role. Appropriate instructions are given for the displacement of medical units by nonorganic transportation. After an initial consideration of general policies and procedures, specific information is provided regarding available highway, rail, water and nonmedical air transportation to be used in the movement of patients. The paragraph ends with a listing of specific medical control procedures. Reference to current SOP's will simplify this paragraph. This paragraph is closely integrated with paragraph 5, but concerns use of nonmedical evacuation means.

Paragraph 7 (Ususually paragraph 4 of the published plan) is concerned with *service.* It includes service rendered by nonmedical agencies to medical facilities during the particular operation, as well as instructions to medical service units not concerned directly with supply, evacuation or hospitalization. Separate subparagraphs cover each phase of medical service functions. Locations, specific missions, times of opening and closing, and troops supported, are given for each activity. SOP's and current sanitary orders are frequently referred to in the subparagraph devoted to preventive medicine. Medical maintenance units are normally included in the "Supply" paragraph due to their normal attachment to supply activities.

Paragraph 8 covers *miscellaneous medical matters.* Medical personnel procedures are

prescribed if different from the normal SOP. Procedures for defense of medical installations, and medical participation in area defense and damage control operations are prescribed. Most of these matters are more properly included in the SOP, but the designation of sector defense surgeons is often indicated. Special medical reports are prescribed in a separate subparagraph, frequently cross referenced to paragraph 3x. Other medical service matters inappropriate for succeeding paragraphs are also covered.

It is noted that special medical operations, such as those associated with CBR or nuclear warfare are not given separate consideration. This omission is intentional, and follows the concept that such items should not and cannot be divorced from the over-all medical planning of the command. In these operations, some medical considerations are supply, others are evacuation, hospitalization or service. Such special or unusual medical requirements and procedures are best integrated into the appropriate paragraph of the standard medical plan.

The ending of the medical plan (or appendix) contains the signature, a list of inclosures (if any), the distribution, and the authentication. These details are usually prescribed by the major headquarters and are not directly concerned with the formulation of the medical plan. Inclosures may include the medical task organization, medical overlay, preventive medicine or professional elaboration, or similar data. The distribution is normally the same as that of the document to which the medical plan is appended, as is the classification.

Medical planning, as any other art, can be mastered only through experience and application. The use of a standard format, however, will assist medical planners, save time, promote understanding and prevent errors of omission. The format recommended in this paper is an aid to medical planners. It must be adapted to special situations as they arise. The format given in Figure No. 1 is recommended for "beginners" in the field of medical planning, and as a "checklist" for those with considerable experience. It has proven valuable in several teaching and operational situations.

Reference

[1] Neel, S. H. Jr.; The Medical Estimate. U. S. Armed Forces M. J. 5:573-579.

A good safety program is a good preventive medicine program.

EDITORIAL

Everyone's Business

WHILE we should always be mindful of our national heritage the month of July should make a greater impression upon us of the United States, when considering our national blessings, than any other month of the year. It was in that month in 1776 that this nation "under God" had its beginning as an independent government.

Our forefathers took a bold step forward to establish firmly the nucleus of this great country in which we now live. We honor them and thank them for their great work. In the 180 years which have followed, we have grown into a great nation. This has not been a growth without struggle. There has been internal and external strife to contend with, but in spite of such diseases the tree has become deeply rooted.

As a nation we must defend this heritage, and as individuals of that nation we must consider defense our business; the nation is only the individual multiplied many times. It behooves every individual, every family, and every organized unit to so consider that obligation.

There was a time even in the lives of many now living when the professional military persons were looked upon as the only necessary persons to constantly maintain the readiness to defend. That day has disappeared.

While the earth maintains its same speed of rotation, man has found rapid and ever increasing speed to circumnavigate this old globe. The pattern has been set and while this ever increasing speed in communication works for the better understanding of our fellow man we always face the fact that humanity advances two steps and falls back one.

This retardation manifests itself in infringements on the rights of others and too frequently in armed conflict with all its attendant horrors. Unfortunately such is the nature of man in his struggle to overcome his weaknesses.

In the full realization of this threat the people of the United States must from now on, until that great millennium, individually and collectively, prepare for survival. In this we must be one, for individually we profit while collectively we survive as a nation.

MORALE

Morale is when your hands and feet keep on working when your head says it can't be done—ADMIRAL BEN MOREEL.

Around the World

By

CLAUDIUS F. MAYER, M.D.

YEMEN has been an independent kingdom since the withdrawal of the Turks in 1918. It is among the strategically important backward countries whose health and welfare greatly interests the politicians of the world. The *Kingdom of Yemen* occupies 77,000 square miles in the southwestern corner of the oil-rich Arabian Peninsula. Having a 310-mile coastline facing Eritrea, it is one of the countries of the southern Red Sea group. Bounded by Aden on the South and Sa'udi Arabia on the North, it merges in the East into the Rub'-al-Khali, the Great Southern Desert of Arabia.

This Arab country has *no adequate health organization,* and the only medical care available for its five million people is provided by a handful of doctors and three hospitals. Here, worse than *medieval conditions* have survived to this day, and practically all modern social and sanitary developments still await introduction. For instance, the system of sewage disposal in such larger cities as Ta'iz and San'a is still very primitive. Solid excreta are collected in special chambers on the bottom floor of each house. The waste water and urine flow from the upper stories in special plastered grooves on the outside of the walls, to run openly in the streets. The water supply is led to the cities in open conduits, thus exposed to the grossest pollution.

In this *Red Sea region, bilharziasis* has existed from time immemorial; it was also described in the medieval Arab manuscripts as well as in the recent reports of various English, Italian and other western investigators, among them the U. S. Naval Medical Research Unit No. 3 (the NAMRU-3) which had a medical mission sent to Yemen in 1951 where Imam Ahmad, the present king, is very eager of getting the benefits of western medicine for his country. From a recently published summary report of the various health surveys and medical observations it is evident that both *Schistosoma haematobium and S. mansoni* are widely spread and firmly entrenched in the whole of Yemen. It is also apparent that, despite the gradual drying-out of Arabia, the snail genus *Bulinus,* which is the unquestioned vector of the disease, still finds excellent habitat in the mountainous regions of this Red Sea kingdom.

From Katmandu, Nepal, came the news that a *Swiss mountaineering expedition* had made two climbs to the top of the 29,028-ft. *Mount Everest* on May 23 and later. This accomplishment is a duplication of the feat of Sir Edmund Hillary and Sherpa N. Tenzing, of the British Expedition, who first reached the top of the World on May 29, 1953. We recall that the British climb of the Everest was very carefully planned by a group of people which also included medical and military experts. The climb could not have been performed without British military experience; indeed, the three *primary factors in high-altitude climb*—namely oxygen, food and clothing—had been already much studied by the Royal Air Force. A later account of the *medical planning* revealed that open-circuit oxygen sets, providing oxygen-air mixtures, were the best against high-altitude anoxia. For the prevention of diarrhea and respiratory diseases, the British climbers spent several preparatory weeks in the area in order to acclimatize themselves to the local food and health environment. Each man needed 5 to 7 pints of fluid daily. The clothings and kits of the expedition were from nylon and rubberized fabric. No one suffered from frostbite or cold feet. Some of the original British equipment, as the "Douglas bag" of the expedi-

tion's physiologist, is now in the possession of the *Royal Army Medical Corps Historical Museum.*

The previous Swiss expeditions to the Everest were also planned with the advice of medical men. One of the experts, Dr. Wyss-Durant, stated that the *biological reaction to the Himalaya* was different from that to other high mountains such as the Andes. In the Andes namely, the base camps are usually set up at altitudes below 15,000 feet, and a person will stay above 21,000 feet but for a brief period of time. Under such conditions of mountaineering, the acclimatization to altitude is not satisfactory, and the well-known symptoms of mountain sickness will appear. In the Himalayas however, the base camps are at higher elevations; the exposure to high altitude is thus more continuous, and it happens under climatic conditions which are hardly compatible with life. The human body is thus required not only to fully acclimatize, which is possible up to 15,000 feet only, but also to adapt itself to altitudes above 21,000 feet, which is physiologically possible only for relatively short periods of time (4-5 days). According to the Swiss experience, altitudes above 24,000 feet bring death to all who are younger than 28 years and older than 45.

In the heart of Southeast Asia, *Malaya* still remained a part of the British Commonwealth though it obtained self-government in 1951-52. Its half-Malay, half-Chinese population has been plagued by Communism since the end of World War II. The Malayan police, together with British troops, succeeded in *forcing the Reds into the jungles. "Operation Metcalf"* was originally planned with the purpose of denying food to communist terrorists; but the operation backfired because the communists were able to clear out small portions of the jungle and to become self-sufficient by producing food. Malaya is four-fifths jungle-covered, the larger part being primary jungle with trees 200-300 feet in height whose upper branches form a thick canopy. Such military terrain of the current Malayan warfare stimulated British ingenuity to create a special type of approach to hidden communist bases. It is *jungle-jumping, a new form of parachuting,* comparable to the efforts of the Canadian Fire Fighting Service. The Malayan jumper is equipped with a 240-ft. long webbing which enables him, after his parachute jump in the jungle, to descend from the top of tall trees.—Jungle-jumping is a very hazardous method of attacking the enemy. According to recent British statistics, 995 such descents resulted in about 46 injuries which were mostly so serious—mostly crush fractures to the lumbar or lower thoracic vertebrae, or ankle fractures—that *helicopters* had to be called for the *evacuation of the wounded.* Before the 'copter rescue party could land in the jungle, however, trees have to be cleared by axes and explosives.

In *Japan, amphetamine consumption* has grown into a very serious menace, according to a memorandum of the pharmacologist professor at Hokkaido University Medical School. The amphetamine, or "wake-amine," started its dangerous action about 1945. A survey revealed that, already in 1948, 1.1% of the entire population, or 5% of the adolescents (16-25 years of age) of Kurume City *on Kyushu Island* were wake-amine addicts. Another estimate of June 1954 put the total number of wake-amine victims in Japan over half a million, and considered 50% of them true addicts. Members of the Japanese Pharmacist Association believe, though, that the amphetamine addicts today are close to a million and a half. It is also evident to them that amphetamine addiction and juvenile delinquency are close relatives.

The symptoms of *amphetamine intoxication* are numerous, but mostly transient and mild. Among the most serious damages of the poison were lately mentioned lesions to the heart, the liver and the suprarenals. There are also some thirty cases of *amphetamine psychosis* recorded from all over the world. No doubt, the most celebrated case is that of a 38-year old French physician who,

after several months' daily intravenous injection of 500 mg wake-amine, recently developed a paranoid type of psychosis. When he was put under police custody however, his mental troubles disappeared 4 days after the drug's withdrawal.

The epidemiology of *typhus fever in the South African Union* was studied in the Plague Research Laboratory at Johannesburg. The years 1934 to 1954 were considered. Maps of distribution of the disease were made, and the role of climatic and environmental factors was investigated. The climatic conditions have apparently little to do with the spread of typhus fever. While in the 1919-1923 period there was an annual average of 8,000 cases of typhus in South Africa, the disease became less frequent after 1945 when the DDT was introduced.

In the *Australian Navy* a group of people are studying the living *habits of whales.* In this age of frogmen and divers, such physiological knowledge might become invaluable in underwater warfare. We remember for instance the continued interest which, since 1938, the British have had for similar reasons in the *physiology and anatomy of seals.* These wonderful animals expire forcibly upon submerging and can dive to a depth of about 100 meters. Certain valves in the bronchi help to modify the buoyancy of these animals in the manner of a Cartesian diver. As the animal dives deeper, the valves prevent the air from entering the lungs from the trachea and pharynx. Electrocardiographic recordings show that *during diving the heart-rate* of the animal drops from 105 to about 10 beats per minute, and this bradycardia persists during the whole period of submersion. The oxygen content of the blood falls steadily to a figure of about 10 mm, below which it cannot fall without the death of the animal. During diving the oxygen is used up at about one third of the rate of the normal resting consumption. Upon returning to the surface, the seal inspires, and the heart-rate returns to normal.

The anatomical names again underwent a thorough review in the hand of the *International Committee on Anatomical Nomenclature* which was commissioned in 1950 by the International Anatomical Congress held at Oxford. The Committee elaborated a new list, called *Nomina anatomica emendata* (N.A.E.), principally based upon the 1895 Basel Nomenclature (BNA). The list was accepted by the International Anatomical congress held last year in Paris. In order to avoid nomenclatural mistakes, the University of Geneva Medical Faculty just issued a *concordance lexicon.* Some of the new rules are very useful. All future publications are encouraged to use the Latin terms of the new nomenclature though they can be anglicized in the daily language. Each organ has now one single term only, and the *use of eponyms* is completely suppressed. Henceforth, it will be up to the professors to transmit to the younger generation of physicians the historical background of their science. Yet difficulties of naming remain in such special fields as the *three-dimensional bronchology* where, according to a Hungarian bronchologist (Kassay), any international committee would be confused by such references as the "apex" of the lower lobe, or the "basal segment" of the upper lobe. (N.B. Nomenclature is an important matter everywhere, and even the features of the ocean bottom have a special Nomenclatural Committee for their naming.)

In Milano, *Don Carlo Gnocchi, Italian military chaplain,* a pattern of charity and love of mankind, died on 28 February this year. Daily papers and illustrated magazines brought reports of his remarkable work for disabled children. His last noble gesture was the donation of his corneas to two blind youths: the 12-year old Silvio Colagrande, who was blinded by quicklime, and the 17-year old Amabile Battista, who lost her sight from a childhood infection. Don Gnocchi wanted to be buried wearing his old cap of an Alpinist, and his silver medal that he earned as a chaplain in the Italo-Russian

campaign. Until now, the laws of Italy did not permit mutilation of the human cadaver; hence, eyebanks could not be established in that country. But, Gnocchi's example caught the imagination, the law was changed, and the *first Italian eyebank* was created at the Forensic Medical Institute in Rome, with one thousand volunteers becoming members of the *Association of Cornea Donors.*

The Second *World Congress on Fertility and Sterility* was held from 18 to 26 May at Naples. It was organized by the International Fertility Association, a group which was organized in 1951 at Rio de Janeiro. Congresses are held by this association every three years, with the attendance of physicians, veterinarians, and sociologists. The first congress met in 1953 in New York. Topics of the second congress were endocrine, metabolic, and hematological factors of fertility and sterility, newer diagnostic methods, treatment of infertility and sterility in women, physiology of ovulation and spermatogenesis, etc. A small group of the members was delegated to *Pope Pius* who talked *on the immorality of artificial human insemination.* He condemned this procedure as a breach of the marriage contract. By the way, *in Australia,* about 5,000 to 6,000 children are born yearly from pregnancies produced by the inseminating syringe. Since the success of human artificial insemination is hardly over 5%, the total number of attempted pregnancies by syringing must be then around 120,000 a year.

Another amazing international congress was held at the end of May in Washington, the one on the *treatment of syphilis,* where a Russian delegation of renowned syphilologists *challenged the antiluetic effect of penicillin,* and condemned the single-shot antibiotic treatment of treponema diseases in general. Their statement is not of such weight, though, as to balance the overwhelming evidence in favor of the inexpensive penicillin cure. Should arsenicals and heavy metals replace the antibiotics in therapy, Africa and other backward countries would fall victims of yaws, syphilis and other venereal diseases. *Experiences in antivenereal African dispensaries* at Bobo-Diulasso and elsewhere show that the African and other primitive environment require a system of treatment which is complete, sterilizing, and of very short duration (e.g., 3 injections of a 2% floccilline) for all forms of treponematosis. Further syphilization of the world would be a grave danger to posterity. It is shocking to realize how *widespread the venereal diseases* are in the world even today. Among one hundred thousand industrial workers in São Paulo, for instance, 3.6% were found serologically positive for syphilis. At other localities, the incidence of syphilis is from 10 to 15%.

Without further scrutiny of the Russian criticism, we should agree however that the *problem of evaluation of a drug* is a very serious one. The literature is never a true indicator of a drug's value, especially not in the first years of a drug's public life. Many may be the articles that are for the drug, but the absence of success rarely gets into print since it is not thought worthwhile to waste paper on printing poor results.

Bukovina is now a part of Ukraina. It forms the Chernovic Oblast. It includes 14 districts, each with a hospital. There are also 67 other country hospitals, 260 feldsher-midwife dispensaries, 210 kolhoz lying-in houses, and 450 child welfare cribs. The Russians point out that none of these was available during the Austro-Hungarian regime, or under the Romanian occupation of the country. There are 530 doctors, and 70 specialists employed in the country hospitals. The chief aim of *medical research in Buchovina* is the eradication of parasitic infections, malaria and gastrointestinal ailments. The reports state with pride that by proper surgical treatment the mortality of peritoneal diseases was reduced below 1.07%.

Radioshooter is the name of an apparatus which is now manufactured in England and exported on a large scale to other European countries. It is a radioscopic machine to show

the position of the foot in the shoe (also used in the U.S.). The *French Academy of Medicine took stand* against the use of such machines. The French law requires that anyone who works with a radiological apparatus must own a medical diploma or must be under the supervision of a medical doctor. Would this regulation be so interpreted that, from now on, for the legal inspection of Madame's toes French shoestores should have radiologists or medical experts available at the counter during shopping hours? . . . *Multa paucis!*

FIRST FLIGHT NURSE PINS WINGS ON GRADUATE

Official Air Force Photo

(L to R) Major Aileen Brimmer, Head, Department of Flight Nursing, Gunter Branch, School of Aviation Medicine; Mrs. W. W. Brier, Tucson, Ariz.; 2nd Lt. Carlene M. Wozniak, Aurora, Ill. For story see page 59.

SUSTAINING MEMBERS

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ASSOCIATION NOTES

Timely items of general interest are accepted for these columns. Deadline is 3rd of month preceding month of issue.

Department of Defense

Ass't Secretary (Health & Medical)—HON. FRANK B. BERRY, M.D.
Deputy Ass't Sec'y—HON. EDW. H. CUSHING, M.D.

PL 569

The military Dependent Care Bill (HR 9429) was signed by the President on June 7 and is known as Public Law 569, 84th Congress.

Wives and children and parents and parents-in-law (if residing with the serviceman) of active duty personnel will be eligible for medical care under this law. Provisions are made for this care from civilian as well as military sources.

Retired military personnel and their dependents will be handled on a facility and staff availability basis, except those retired non-career reserves (Title III) with less than 8 years' service.

Details of the operation of the law must be worked out by the Department of Defense.

NATIONAL MEDICAL LIBRARY

The Armed Forces Medical Library may someday be known as the *National Library of Medicine* if Congress enacts legislation now covered by S. 3430. It appears also that the U. S. Public Health Service may be heir to this valuable heirloom of the Army which has been known as the Surgeon General's Library, the Army Medical Library and lately as the Armed Forces Medical Library.

A movement is on to have the library relocated in Chicago but it is unlikely that this internationally known institution would be located outside of Washington, its birthplace.

MEDICAL SUPPLY

Under the single manager plan the Navy is now responsible for medical-dental supplies for the Armed Forces. The Bureau of Supplies and Accounts of the Department of the Navy is the division that has charge of the activities.

Rear Admiral William L. Knickerbocker, formerly Commanding Officer of the Naval Supply Activities in New York, is heading the new section which has been created.

DOCTOR DRAFT

The Department of Defense has requested the Selective Service to call 380 physicians during the month of July for duty with the Navy. This call will probably meet the needs of the services through October.

SELECTIVE SERVICE

The Department of Defense has requested the Selective Service System to provide 13,000 men during July for assignment to the Army. The other services have not placed calls for July.

VETERINARIAN SITUATION

The Secretary of Defense wants to do away with the Veterinary Corps of the services. This decision definitely stems from his misinformation or lack of information on the functions of the Corps. It would be well for him to review the situation in the Spanish-American War before proceeding in any drastic action.

We question his authority to eliminate the Corps by his order since the establishment of the Veterinary Corps was a Congressional action.

INTERAGENCY INSTITUTES DIRECTOR

Colonel Frederick H. Gibbs, MSC, U. S. Army, has assumed the position of Director of the Interagency Institutes for Federal Hospital Administrators with office at the Walter Reed Army Medical Center, Washington, D.C.

Prior to this assignment Colonel Gibbs was Director of the Department of Administration at the Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.

In this new assignment he succeeds Colonel Byron Steger, Division of Education and Training, Office of the Surgeon General of the Army. Colonel Steger for the past year has been acting in a dual capacity, that of the Director of the Institutes and Chief of the Division of Training.

The Director of the Interagency Institutes is responsible to a governing board composed of two members from the Executive Office of the President of the United States, and one representative from each of the federal hospitals systems, Army, Navy, Air Force, Public Health Service, and Veterans Administration.

Colonel Gibbs organized the hospital management research and improvement program for the Army Surgeon General during an assignment in Washington, from 1948 to 1952. He is a member of the American Hospital Association, the American College of Hospital Administrators, and was first president of the Federal Interagency Hospital Institute Alumni Association.

Army

Surgeon General—MAJ. GEN. SILAS B. HAYS

Deputy Surg. Gen.—MAJ. GEN. JAMES P. COONEY

RESPIRATORY DISEASE VACCINE

A new vaccine has been developed for the prevention of acute respiratory disease by the Department of Respiratory Diseases of the Walter Reed Army Institute of Research.

The development of this vaccine by Dr. Hilleman and his associates is expected to materially reduce the incidence of the disease among the recruits in the service. Work of the evaluation of the vaccine was done at Fort Dix, N.J., by Major Reuel A. Stallones and Dr. Ross L. Gauld of the Institute.

This new vaccine is prepared from tissue cultures of monkey kidney which is infected with the two predominant RI viruses which were discovered in recruits at Fort Leonard Wood, Mo.

MEDICAL CARE

Civilian Medical Care for Army Military Personnel is set forth in a letter from the Surgeon General, May 2. "Medical care is provided for Army military personnel in the United States generally by dispensaries and hospitals located at military installations throughout the country. There are many locations, however, where Army or other U. S. Federal medical treatment facilities are not available. In such cases the services of civilian physicians, clinics, and hospitals are necessary. . . .

"Civilian medical care, other than elective, is authorized for commissioned officers, warrant officers, enlisted personnel and cadets of the U. S. Military Academy when these personnel are on duty status or when they are absent from their place of duty on other authorized non-duty status. Payment for civilian medical expenses incurred by Army personnel who are absent without leave is not authorized. . . .

"Army personnel are authorized civilian medical care only when there are no military or other federal medical treatment facilities available. First aid or emergency treatment is authorized at any time. In this connection, emergency medical care may be defined as that which is required to save life or limb,

or that which prevents great suffering. Surgical operations should not be performed without prior approval of the surgeon of the nearest military installation or the appropriate military authority listed below, unless indicated as an emergency procedure. . . .

"As a general rule military authorities will furnish the civilian medical agency with prior written approval for ordinary medical care to Army personnel under their jurisdiction. . . ."

Any bills incurred should be submitted to "The Surgeon": *First Army, Governors Island, New York, N.Y.* (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont); *Second Army, Fort George G. Meade, Maryland* (Delaware, Kentucky, Maryland, Ohio, Pennsylvania, Virginia, West Virginia); *Third Army, Fort McPherson, Georgia* (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee); *Fourth Army, Fort Sam Houston, Texas* (Arkansas, Louisiana, New Mexico, Oklahoma, Texas); *Fifth Army, 1660 E. Hyde Park Blvd., Chicago 15, Ill.* (Colorado, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin, Wyoming); *Sixth Army, Presidio of San Francisco, Calif.* (Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, Washington); *Military District of Washington* (Washington, D.C.).

THORACIC SURGERY COURSE

Regular Army Medical Corps general surgeons who are board certified may pursue a 6-month course in thoracic surgery if interested. A new course, the second year offered, will start at Valley Forge Army Hospital and Brooke Army Hospital July 1. Assignment to the course will involve a permanent change of station.

SGO ASSIGNMENT

Colonel Roy D. Maxwell has been appointed Chief of the Medical Allied Sciences Section of the Surgeon General's Office. This assignment is in addition to his duties in connection with the Armed Forces Special Weapons Project.

He is a native of Oklahoma City. The State University of Iowa conferred on him the degrees of M.S. and Ph.D. in chemistry.

CHIEF OF DIETITIANS

Major Helen M. Davis, AMSC, will assume her duties about July 16 as the new chief of the Dietitian Section of the Army Medical Specialist Corps. At that time she will be promoted to the temporary rank of lieutenant colonel. She comes to this new assignment from Tripler Army Hospital in Hawaii.

Major Davis replaces Lt. Colonel Hilda M. Lovett who completes her four year statutory appointment and will be assigned as Chief, Food Service Division, Walter Reed Army Hospital.

HONORED

Dr. Loyal Davis, a former colonel in the Army Medical Corps, who was consultant on neurological surgery to the chief surgeon of the European theater of operations during World War II, has been elected president of the American Surgical Association.

Dr. Davis, an internationally known neurosurgeon, is chairman of the department of surgery at the Northwestern University Medical School, and attending surgeon at the Passavant Memorial Hospital in Chicago.

Colonel Bernard Aabel, Chief of the Army Medical Service Corps, has received the award for outstanding achievement from the University of Minnesota. The award consists of a gold medal and an embossed citation.

Colonel Aabel graduated from the University of Minnesota in 1932. He is one of two alumni to be thus honored this year. He became Chief of the Medical Service Corps on April 29, 1955.

NEW PTS AT WRAMC

Newly commissioned second lieutenants who have started a twenty-week course in physical therapy at Walter Reed Army Medi-

cal Center are: Nerlane Chandler, Martha Jean Craig, Rosemary G. Lehrer, Joan E. Smith, Nancy E. Taft, Lorrine E. Thompson.

FELLOWSHIP CERTIFICATE

Lt. Colonel Edward J. Dehne, MC, Chief of the Army Environmental Health Laboratory, Army Chemical Center, Maryland, has been awarded a Fellowship Certificate in the Industrial Medical Association.

Colonel Dehne has had a broad experience in industrial and preventive medicine. One of his important assignments was Chief of Preventive Medicine in the Office of Military Government for Germany from 1945 to 1948.

ASSIGNED TO VALLEY FORGE

Brig General Sam F. Seeley, MC, has been assigned to Valley Forge Army Hospital as Commanding Officer. He has been the Surgical Consultant of the U. S. Army Forces in Europe for the past three years.

DIRECTOR OF SUPPLY AT BAMC

Col. Bernard J. Kotte, MSC, has been named as Director of the Supply Division of the Brooke Army Medical Center, as announced recently by Maj. General William E. Shambora, Commanding General of the Center.

Colonel Kotte who was formerly Executive Officer of the Supply Division in the Office of the Surgeon General of the Army succeeds Colonel Everett W. Partin who has been assigned to the Sixth Army Headquarters.

The supply division at Brooke Army Medical Center is responsible for transportation with its 600 vehicles, the food service which feeds 7,000 people daily, and also engineer and signal liaison.

PIO AT BAMC

Lt. Colonel Tom O. Mathews, former Chief of the Radio and Television Branch in the Department of the Army Public Information Division in Washington, has been assigned to Brooke Army Medical Center as Public Information Officer. He has been engaged in information and related activities during the major portion of his Army career.

Colonel Mathews succeeds Major Edwin S. Marsh, Public Information Officer for the past two and a half years, who will attend the hospital administration course at the Army Medical Service School.

GRADUATES AT BAMC

There were 52 students who graduated on June 22 from the course in hospital administration given at the Army Medical Service School, Brooke Army Medical Center.

These students portrayed the roles of field commanders and staff officers at LOGEX 56 recently staged at Fort Lee, Va., and later spent some time at selected military and civilian hospitals in Texas.

ARMY MEDICAL SCHOOL

An additional three thousand students enrolling at the Army Medical Service School during the academic year which began July 1 will boost the population of Brooke Army Medical Center in the coming year, Brigadier General Elbert DeCoursey, School Commandant, announced.

Scheduled to attend 18 basic and advanced courses are 5,756 officers. Approximately six thousand enlisted men and women will enroll in 23 varied medical technical courses. Classes range from one week to a year in length.

The largest single increase will be in an enlisted class for medical aidmen. This is a 12-week course, with eight weeks devoted to formal classroom and field instruction and the remaining four weeks to on-the-job training at selected Army hospitals.

Students in the medical aidman course are trained to attend men wounded in action before they can be aided by a medical officer. In addition, aidmen assist in more complicated treatment procedures at forward medical installations.

ASSIGNMENTS BAMC

Colonel William A. Hamrick, MSC, has been assigned as the new Director of the

Department of Administration, Army Medical School, Brooke Army Medical Center, Fort Sam Houston, Texas. Prior to his assignment at the Center he was in the Office of the Secretary of Defense. He succeeds Col. Frederick H. Gibbs who has been transferred to Washington.

Colonel Raymond E. Duke, MC, has been assigned as Assistant Commandant of the Army Medical Service School replacing Col. James L. Snyder who has left for Germany. The Commandant of this school is Brig. General Elbert DeCoursey.

Col. Duke received his medical degree from the University of Oregon in 1934 and then entered military service. He has had a broad experience in the field of military training, and has seen service in the combat areas in Europe and the Pacific.

Ten new officers have arrived at Brooke Army Medical Center for assignment to instructor and administrative positions at the Army Medical Service School, Brigadier General Elbert DeCoursey, the School Commandant, has announced.

The instructors, all captains, are Arthur D. Weatherhead who will be in Neuropsychiatric Procedures, Elizabeth Duval in Houston Procedures, Robert J. Birnkrant in Professional Sciences, William H. Duvall in Military Science, and Daniel J. Reynolds in Preventive Medicine.

Major John A. Brown has been assigned to the Doctrine Branch of the Training Publications Office. Captain Michael J. Pavlo and Chief Warrant Officer Julius B. Jarrell are both in the Military Personnel Division, and Chief Warrant Officer Henry M. Mundle is an Administrative Assistant in the Inspection Office. Second Lieutenant Raymond A. Jackson is a Platoon Leader with the 520th Medical Clearing Company of the 37th Medical Battalion.

MASTER OF SCIENCE DEGREE

Five residents at Brooke Army Hospital received their Master of Science degrees in surgery at Baylor University Commencement exercises May 25. Those awarded the degree are Lt. Colonels Arren C. Buchanan, Donald Fahy, and Jacob Schirmer; Major Thomas Nelson; and Captain Garth B. Dettinger.

NURSES AWARDED DEGREES

Nine nurses from Brooke Army Hospital have received their Bachelor of Science degrees in nursing from Incarnate Word College in San Antonio. This was made possible by their study on off-duty time while carrying a full work-load in the hospital. The degrees were awarded to: Majors Maude Benedict and Mary Burrows, and Captains Ada Boone, Hannah Browne, Claudia Fore, Mary Jones, Wanda Klos, Frances Leary, and Patricia Murphy.

Navy

Surgeon General—Rear Adm. Bartholomew W. Hogan

Deputy Surgeon General—Rear Admiral Bruce E. Bradley

HONORED

Rear Admiral Bartholomew W. Hogan, Surgeon General of the Navy, received the honorary degree of Doctor of Science at Marquette University, Milwaukee, Wis., on June 3 during the commencement exercises of that university.

ASSIGNMENT BUMED

Captain Harry J. Alvis, MC, is now the Director of the Submarine Medicine Division, Bureau of Medicine and Surgery. He relieved Capt. Moffitt K. Holler, MC, who has reported for duty as Medical Officer to Submarine Squadron One, with additional duty on the Staff of Commander, Submarine Force, Pacific Fleet.

PRESIDENT APA

Captain Francis J. Braceland, MC, U. S. Navy Reserve, Inactive, who is Advisor and Consultant to the Surgeon General of the Navy, took office in May as President of

the American Psychiatric Association. He is at present Psychiatrist-in-Chief at the Institute of Living, Hospital, Hartford, Conn.

PRESIDENT-ELECT ACP

Rear Admiral Arminius Kern, USNR, Retired, was voted in office as President-Elect of the American College of Physicians at its Los Angeles meeting recently. He served in both World Wars, and it is a matter of interest that in both these wars he had a tour of duty on the *USS Solace*. His present address is 1239 Remington Road, Wynnewood, Pa.

ORAL PATHOLOGY ACADEMY VP

Commander Henry H. Scofield, D.C., Naval Dental School, Bethesda, Maryland, was recently elected Second Vice-President of the American Academy of Oral Pathology.

PROSTHODONTISTS PRAISED

In a recent letter received by Rear Admiral Ralph W. Malone, Chief, Dental Division, from Dr. S. Howard Payne, Secretary, American Board of Prosthodontics those Navy dentists appearing before the Board were found to be "among the best prepared for the Board."

INCREASE IN DENTISTS

In the first five months of this year over 60 applications for appointment in the Regular Navy Dental Corps have been received by the Dental Division, Bureau of Medicine and Surgery.

Twenty of these applications are from reserve dental officers who have served on active duty for periods of six months or longer. The other applications are from dental students who either participated in this year's Navy Senior Dental Student Program as Ensigns 1995 USNR on active duty or who have been selected for Naval Dental Internships in Fiscal Year 1957.

Other applications have recently been received by District and Staff officers as a result of the Medical and Dental Officers Procurement Act signed by President Eisenhower April 30, 1956.

ELECTRONICS AUTHORITY JOINS NDS

LCDR Robert R. Perkins, DC, an authority on electronics has joined the staff of the Naval Dental School, at the National Naval Medical Center, Bethesda, Md.

In 1954 he received a $500 award in the National Electronics Contest sponsored by the Raytheon Manufacturing Corp., for a manuscript and model dealing with the application of *Transistors for Determining Tooth Vitality.*

Air Force

Surgeon General—MAJ. GEN. DAN C. OGLE
Deputy Surg. Gen.—MAJ. GEN. W. H. POWELL, JR.

HONORED

Colonel Fratis L. Duff, USAF (MC), Commander, Gunter Branch, School of Aviation Medicine, Gunter Air Force Base, Montgomery, Alabama, recently received two honors: election to fellowship in the Aero Medical Association, and election to fellowship in the American College of Physicians.

FOUND

Mrs. W. W. Brier was found in Tucson, Ariz., after a four-month search by the Air Force School of Aviation Medicine.

The former Lt. Geraldine F. Dishroon, now the wife of an Air Force colonel, was the first Flight Nurse graduated by the Air Force on February 18, 1943, at Bowman Field, Ky., at which time Brig. Gen. David N. W. Grant pinned on her his own Flight Surgeon's wings. At that time there was no insignia for a Flight Nurse.

Why was she wanted by the School of Aviation Medicine? Colonel John R. McGraw, Acting Commandant of the school was also Commandant of the Air Evacuation School back there in 1943 when Lt. Dishroon

graduated. He wanted her to be present at the next Flight Nurse graduation and tell about her wartime experiences.

SPACE SHIP

A "space ship" has been added to the research tools of the School of Aviation Medicine. Well, at least one that will give the effect for 45 seconds.

An F-94C "Starfire" jet interceptor, with speed of more than 600 miles per hour, flies on a curved flight path, resembling the trajectory of an artillery shell or ballistic missile.

The effect of weightlessness lasts just 45 seconds, and during this phase Dr. Siegfried J. Gerathewohl, a psychologist at the school has been able to carry out certain tests.

In the tests with a slower plane handled in the same manner, the pilot, Major Herbert D. Stallings, Jr., and Dr. Gerathewohl found no definite indication that weightlessness produces any disturbances of orientation or coordination so persistent that a flyer can not overcome them with practice and experience. Tests with the faster plane are not completed.

FLIGHT SURGEON RATINGS

In the future Flight Surgeons will be designated in three categories:

Chief Flight Surgeon. Must be currently on flying status, actively engaged in aviation medicine and must hold senior flight surgeon or aircraft observer rating. He must have 15 years on flying status in aviation medicine and have at least 1,500 hours of flying time.

Senior Flight Surgeon. Must be currently on flying status, actively engaged in aviation medicine and must hold flight surgeon or aircraft observer rating. He must have seven years on flying status in aviation medicine and have at least 1,000 hours of flying time. These physicians must have special training.

Flight Surgeon. Must have one year's practice of aviation medicine as an Aviation Medical Examiner on flying status; at least 100 hours of flying time. Requires completion of Advanced Course in Aviation Medicine at the Air Force School of Aviation Medicine.

Public Health Service

Surgeon General—LEONARD A. SCHEELE, M.D.

Deputy Surg. Gen.—W. PALMER DEERING, M.D.

RESEARCH GRANTS

A large increase for research has been approved by the Senate Appropriations Committee for the National Institutes of Health, Bethesda, Maryland. Last year $102,100,000 was made available; this year $184,400,000 has been approved.

INDIAN HEALTH ADVISORY COMMITTEE

An Advisory Committee on Indian Health to assist in the improvement and expansion of medical care and health services to American Indians has been appointed.

Three of the members of the committee are Indians: Honorable N. B. Johnson, Chief Justice of the Supreme Court of Oklahoma; Mrs. Anna Wauneka of Window Rock, Arizona, Chairman of the Navajo Tribal Council's Health Committee; and Mr. Frank Ducheneaux of Cheyenne Agency, South Dakota, Chairman of the Cheyenne River Sioux Tribal Council.

Other members are: Robert B. Atwood, Anchorage, Alaska; Dr. Robert Neff Barr, Minneapolis, Minn.; Dr. Fred T. Foard, Raleigh, N. C.; Dr. Alexander H. Leighton, Cornell University; Dr. James Perkins, National Tuberculosis Association; and Dr. Raymond F. Peterson, Butte, Montana.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.

Deputy Chief Med. Dir.—R. A. WOLFORD, M.D.

ERROR

We regret the error that has been appear-

ing in the spelling of the name of the Chief Medical Director of the Veterans Administration. The correct spelling is "Middleton" and not "Middelton" as we have been printing it.

PATIENT LOAD

The average daily veteran patient load (total) in hospitals for the month of April was 114,924 as against 111,670 in April 1955. Outpatient visits for March (1956) totaled 182,333 as against 198, 864 in March of 1955.

APPOINTMENT

Dr. Rafael Rodriquez-Molina, M.D., F.A.C.P., formerly Chief, Medical Service, at the Veterans Administration Hospital in San Juan, Puerto Rico, has been appointed Assistant Director, Professional Services for Research at that institution.

ANESTHESIOLOGY TRAINING

A training program has been started for training in anesthesiology for full-time physicians in the Veterans Administration.

The program will be carried out in the VA hospitals at Bronx, N.Y.; Hines, Ill.; Richmond, Va.; St. Louis, Mo., and at the VA center in Los Angeles, Calif. This program will not be a substitute for the regular residency program, nor will it interfere with the program now in effect.

TRANQUILIZING DRUG STUDY

The Veterans Administration is launching a large-scale study of the new tranquilizing drugs for mental illness. Dr. Jesse F. Casey, Director of the Psychiatry and Neurology Service in the Central Office of the Administration believes many of the answers to questions about the drugs will be made known through this study.

This project will be directed by an executive committee of which Dr. S. T. Ginsberg, Chief of the Psychiatry Division in the Central Office will be chairman.

REPORTS ON CANCER

At the National Cancer Conference in Detroit, June 4-6, Dr. Oscar Auerbach, Chief of the Laboratory Service, Veterans Administration Hospital, East Orange, N.J., reported on a further study of the tracheobronchial tree of humans, both smokers and non-smokers.

Of the 117 cases reported on, 34—all smokers—had died of cancer. There were 29,000 slides examined. The total cases studied to date is 158. This report was signed by six VA physicians and Dr. Purdy Stout, a VA consultant and professor emeritus of surgical pathology at Columbia University School of Medicine.

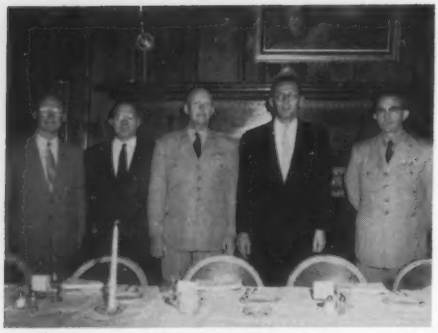
Also reported at the Conference was a study made by Dr. Ludwik Gross, Chief of the Cancer Research Unit, Veterans Administration Hospital, Bronx, N.Y. He has worked extensively on mouse leukemia and has shown its transmission by a virus.

Dr. Gross has now shown that some of these animals develop not leukemia but tumors of the salivary glands or subcutaneous sarcomas. His problem now is to determine whether leukemia and the salivary and subcutaneous tumors are caused by the same virus or by different, though possibly related viruses.

New York Chapter

On a cold day last May 17th, the New York Chapter held its spring meeting that was scheduled two months previously. The blizzard that prevented the March meeting was alluded to a number of times by those present because of the chill that had descended on the New York area that May day, and was particularly noticeable at Mitchel Field where the meeting was held.

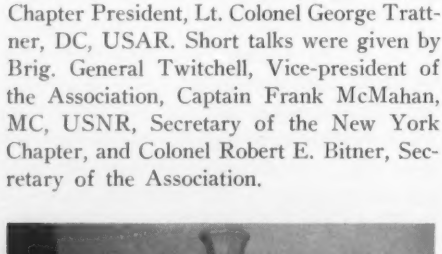
Brigadier General Harold H. Twitchell, USAF (MC), Surgeon of the Continental Air Command, had arranged for all members and their wives to inspect the "Samaritan," the plane especially designed for transporting military patients to the various service hospitals in the continental United States. (See *The Military Surgeon,* May 1954). It was a real pleasure to visit the interior of this plane and see all the equipment provided for the comfort and care of patients.



(L to R) Capt. Frank McMahan, MC, USNR; Col. R. E. Bitner, USA, Ret.; Brig. Gen. H. H. Twitchell, USAF (MC); Lt. Col. Geo. Trattner, DC, USAR; Col. L. R. Braswell, USAF (MC).

Following the plane inspection a visit was made to the physiological chamber where we had the opportunity to sit in the big iron box (commonly known as the decompression chamber) while an instructive talk was given by the airman in charge. Here conditions simulating altitudes up to 43,000 feet can be experienced by air crews. They are instructed in the importance of oxygen and the use of the apparatus.

The Master of Ceremonies at the dinner which followed at the Officers' Club was the Chapter President, Lt. Colonel George Trattner, DC, USAR. Short talks were given by Brig. General Twitchell, Vice-president of the Association, Captain Frank McMahan, MC, USNR, Secretary of the New York Chapter, and Colonel Robert E. Bitner, Secretary of the Association.



(L to R) Mrs. Twitchell, Brig. Gen. Twitchell, Lt. Col. Trattner, Mrs. Trattner, Capt. McMahan.

The main speaker of the evening was Colonel L. Render Braswell, USAF (MC), MATS Surgeon, from Andrews Air Force Base, Washington, D.C. He gave a very interesting, illustrated talk on the air evacuation of patients from the overseas bases and their transportation to military hospitals in the United States. Colonel Braswell pointed out the great advances that have been made in air evacuation since the early part of 1942, and impressed everyone with the rapidity and safety of travel, and the comfort to the patients. He stated that there are few patients who cannot now be transported by air, even a polio case which requires treatment in an "iron lung."

How far we have come since 1942!

Miscellaneous

MEDICAL ASSEMBLY REPORT

Colonel Roland I. Pritikin, MC, USAR, Rockford, Illinois, represented the Association at the Sixth Middle East Medical Assembly held in Beirut, Lebanon, in April.

He reports that the medical problems of the Middle East, notably those of Public Health, Cancer, and Industrialization were discussed. One of the big problems is trachoma, and much work is being done in that field. Some of the salient features of the work include improvement of diet in the trachomatous areas, prophylaxis and improvement of the sanitary conditions, hygenic methods and continuous treatment of all trachoma patients, the use of cortisone and corticotropic drugs, the use of sulfonamides and antibiotics in the treatment of trachoma, surgical treatment of the complications of the disease, and the studies in pathology and epidemiology of trachoma.

Colonel Pritikin reports that he saw the first patient in the Middle East (except for Israel) with retrolental fibroplasia. The parents were American.

PROBLEM OF AGING

The problem involved in the care of the aged individuals are many, and with the increasing numbers of persons entering that

group the problems will increase. We must face up to the situation and find solutions to these problems as there is no one solution.

A Federal-State Conference on Aging cosponsored by the Federal Council on Aging and the Council of State Governments was held in Washington, D.C., June 5-7. The purpose was to review and plan State and Federal responsibility and action in the field of aging.

Topics discussed were employment, retirement, income maintenance, health, housing and living arrangements, and recreation.

CANCER

Dr. Matthew H. Griswold, Chief of the Division of Cancer and other Chronic Diseases, Connecticut State Department of Health, has made public a report, "Cancer in Connecticut—1935-1951," which presents data on 75,494 cases during the 17 year period.

The Connecticut Cancer Record Register is unique in that it is the only known continuous record of all recognized cases of cancer collected from the total population of the state with a life-time medical follow-up, over so long a period.

The report indicates that definite progress has been made in saving and extending the lives of cancer patients and tends to corroborate the validity of the five-year survival concept as a reliable index of successful treatment. Five year survivals of Connecticut cancer patients increased from 19 percent in the period 1935-1940 to 25 percent in the 1947-1951 period for males and from 29 to 38 percent in the same period for females.

Marked improvement is noted in survival rates for cancer of the large intestine, rectum, prostate, thyroid, uterine cervix and main body of the uterus. The report indicates relatively no improvement, however, in survival rates for cancer of the stomach, lung, esophagus and ovary.

Two other important observations were made. One is that cancer incidence rates are clearly higher for urban than for rural populations. The other is that experience among the 2,000,000 people in Connecticut corroborates the sharp increase in lung cancer among men that has been noted in the national population.

HEARING TESTS

The University of Wisconsin has reported that part of the crowd at the Wisconsin State Fair participated in hearing tests which may help industry conserve the hearing of its workers.

Dr. Aran Glorig of Los Angeles said that the 3,000 persons tested will provide a norm of expectancy for comparative purposes in hearing conservation programs. Complete ear examinations and hearing tests were made on the 3,000 persons who were chosen at random. Their occupations were recorded.

This work is one step in a noise control program concerning which Dr. Charles Williams of the Liberty Mutual Insurance Company said, "You can either wrap up the machine or wrap up the man." He explained that silencing material can be placed around smaller machines; for large machines, which cannot be silenced practically, industry can provide an alternative in soundproof booths for operators.

PRIVATE MEDICAL SCHOOL GIFT

The Ford Foundation, 477 Madison Ave., New York, recently announced the appointment of a committee headed by Lee DuBridge, President of the California Institute of Technology, for the distribution of $90,000,000 to the nation's privately-supported medical schools. This is part of the $500,000,000 which was announced in December 1955 but is entirely apart from the $10,000,000 appropriated on April 15 to the National Fund for Medical Education.

CONFERENCE ON OCCUPATIONAL MEDICINE AND TOXICOLOGY

The University of Miami, School of Medicine, jointly with the University of Havana, School of Medicine, Cuba, will hold this year the first inter-American Conference on Occupational Medicine and Toxicology. The meeting will be held September 3 to 7. The official language of the program will be Spanish.

This year the conference will be held in Miami with the University of Miami, School of Medicine serving as host. It is expected that this Conference will be repeated next year with the University of Havana serving as host.

Papers to be presented include topics such as the following: Establishment of a "Medical Department in Industry," "Work and Fatigue in Industry," "Effects of Environmental Conditions on the Health of the Occupational Worker," "Recording of Medical Case Histories," "Control of Malaria in Endemic Areas," "Occupation and Heart Disease," "The Role of the Anesthesiologist in Acute Poisonings," "Neurological Problems in Occupational Medicine and Toxicology," "The Treatment of Intoxications by Organic Phosphates," "Management of Berylliosis," "Treatment of Manganese Intoxications."

CONGRESS OF GERONTOLOGY

The First PanAmerican Congress of Gerontology will be held in Mexico City, September 15-22, 1956. An invitation has been extended to members of the Association of Military Surgeons of the United States to present papers, and to attend the convention. Space for exhibits can also be arranged.

Dr. Eduardo Medina Maldonado, a member of our Association, is on the Committee for Scientific Activities and will be glad to receive communications from our members regarding the Congress. His address is: Avenidao Fernando Num. 239, Mexico 13, D.F.

SURGICAL AWARD COMPETITION

The Southeastern Surgical Congress has announced its Annual Prize Scientific Paper Award for 1957. The best unpublished contribution on surgery or allied subjects will be awarded $100 and expenses for the author to attend its meeting in St. Petersburg, Fla., April 1-4, 1957.

Manuscripts submitted must be typewritten in English in a form suitable for publication. Send manuscripts to The Southeastern Surgical Congress, Attention: A. H. Letton, M.D., Chairman, Scientific Paper Award Committee.

ITALIAN WAR CLAIMS

United States citizens or business organizations who suffered property losses during World War II as a result of Italian military action must file their claims before September 30, 1956 to have them considered. All claims must be filed with the Foreign Claims Settlement Commission, Washington 25, D.C.

FLUORIDE

"Rats given water containing 20 times as much fluoride as is recommended for controlled fluoridation were not affected in terms of body growth, thyroid condition or blood composition."
Medical Research Bulletin: 10:10 (Mar.-Apr.)

ACCIDENTS

For every 16 people between the ages of 15 and 24 who die of cancer or heart disease 61 die in accidents. In 1951 polio claimed 836 children under 14, while 11,441 children in the same age bracket were killed in traffic accidents. In 1954, 90,000 human lives were lost—36,000 of them on streets and highways.—*Survey Bulletin.*

TAXES

A married man with one child and an income of $10,000 a year pays $1,504 in income taxes in the U.S.; $3,130 in Italy; $3,335 in Britain; $3,460 in France; $3,675 in West Germany—*Survey Bulletin.*

1954 CENSUS OF BUSINESS

Preliminary figures just released by the Bureau of Census show that the sales of surgical, medical, and hospital supply houses totaled $314 million during 1954, which is an increase of 46 percent over the dollar volume recorded in the last previous Census of Business year (1948).

Figures given for previous years are: $28 million (1929); $52 million (1939); $215 million (1948).

GOVERNMENT PUBLICATIONS

Radioisotopes in Medicine $5.50
Cat. No. Y 3 At 7:2 M 46/3
Follow-Up Study of War Neuroses .. 2.25
Cat. No. VA 1.2: N39
Standard First Aid Training Course .. 1.00
Cat. No. D 208.11: F 51/3
Civil Defense Glossary ..... .25
Cat. No. FCD 1.6/4:25-2

Above can be procured from the Sup't of Documents, Gov. Printing Off., Washington 25, D.C. Send check or money order. Postage prepaid.

WHO PUBLICATIONS

Bull. Occupation Health $2.00
Vol. 13, No. 4
Bilharziasis 2.00
Vol. 14, No. 1/56
Control of Insect Vectors in Int. Air Traffic ..... .70
Report on Nutrition #4
Tech. Report #97 ..... .60
Poliomyelitis Vaccination.
Tech. Report #101 ..... .30
Cholera Studies
Vol. 13, No. 6/55 ..... 2.00

Above may be obtained from the Columbia University Press, Int. Doc. Serv., 2960 Broadway, New York 27, N.Y.

SOMETHING NEW

A *cooling pad* for the comfort of patients in hot weather has been developed. Cooling is accomplished by circulating water through plastic tubing by means of a small electric pump.

A *cordless hearing aid* which fits behind one ear and houses both the receiver and amplifier has been made possible by modern electronics and especially the newly developed transistor.

A *small organic chemistry laboratory* which occupies only 2.5 sq. ft. of laboratory space will most likely prove useful for the office of the research chemist.

Indicator slips for surgical dressing bundles which show that bundle has actually been properly autoclaved by changing the words printed on the slip from "not autoclaved" to "autoclaved."

Detectable gauze sponges which show up in an x-ray. The answer to the "missing sponge."

Visual Assistant. Nurse can now sit at her desk and see what is going on in a patient's room and also talk with the patient. Patient can cut off speaker and camera.

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Lt. Col. Wilber H. Arnberg, MSC, USA
Major Rex M. Barrett, MSC, USAR
Lt. Eloi Simoes Bona, MC, Brazilian Navy
Major Wm. F. Bruckel, MC, NY, NG.
Col. Donald E. Carle, MC, USA
Mr. Carl E. Cluesmann
Rear Adm. W. Dana, (MC), USN
Col. Merrill C. Davenport, MC, USA
Lt. Col. Wm. A. Easter, MC, CAP
Med. Dir. G. P. Ferrazzanno, USPHS
Major Gen. Alvin L. Gorby, MC, USA
Col. Oscar B. Griggs, MC, USA
Lt. Cdr. G. A. Houp, NC, USN
Lt. Col. W. L. Jett, Jr., MSC, USAR
Capt. Eugene V. Jobe, (MC), USN
Capt. Harry H. Lipcon, MC, USNR
Capt. Julian Love, (MC), USN
Lt. Col. John A. Maroney, MC, AUS
Lt. Col. Manuel M. Maslansky, DC, USAR
Col. Arthur L. Streeter, USAF (MC)
Col. Clark B. Williams, MC, USA

Change in Constitution Proposed

To be acted on at the 63rd Annual Convention, November 12-14, 1956

AT THE business meeting of the 62nd Annual Convention of the Association of Military Surgeons of the United States, held November 9, 1955 the following resolution was passed:

"WHEREAS, Membership eligibility in the Association of Military Surgeons of the United States as now defined in the Constitution and By-Laws does not recognize personnel identified with either the Civil Defense Administration or Atomic Energy Commission,

"WHEREAS, These two agencies are attracting personnel in increasing numbers whose eligibility would not be questioned if they represented one of the recognized services,

"BE IT RESOLVED, That proper steps be taken to amend the Constitution and By-Laws so as to include personnel from these services who are otherwise eligible."

In accordance with the provisions of the Constitution of the Association the president appointed a committee to study the resolution and prepare the necessary amendment. The committee presented the following proposed change to Section 4, Article III of the Constitution of the Association:

"The Secretary of Defense; the Secretary of the Department of Health, Education, and Welfare; the Secretary of the Army; the Secretary of the Navy; the Secretary of Air Force; and the Administrator of Veterans Affairs; *the Chairman, Atomic Energy Commission; and the Director, Federal Civil Defense Administration;* in conformity with the Act under which this Constitution is adopted, shall be ex officio members of the Association, while holding their respective offices."

After considerable discussion of the proposed change the Executive Council declared its opposition to any change in the constitution. It was the consensus of opinion that eligibility for membership already covers a wide field of interests including a large majority of the medical personnel of the Civil Defense Administration, and the Atomic Energy Commission, and any changes in the constitution are unnecessary.

THE TRUTH ABOUT CANCER

DR. CHARLES S. CAMERON, *Medical and Scientific Director of the American Cancer Society*
(Prentice-Hall, Inc., New York, $4.95.)

April was considered *Cancer Month.* That was the month when publicity was particularly given to this dark shadow which casts itself over the lives of many people. The timing for the release of the book, *The Truth About Cancer,* for that month was appropriate.

The book has made its bow to the public. Now the news should be spread. This is not only an April book, but one that should be read every month of the year. He who reads the book, spreads the news, and advises others to read the book will be doing a real service. Here within the covers of *The Truth About Cancer* is information people should know.

"If we never learned another new fact about cancer—either in the research laboratories or in the clinics—it would still be possible to save twice as many lives as are now saved by making the best use of what is already known.

"And that means saving 80,000 lives a year that are now being lost unnecessarily."

OBITUARIES

Capt. L. A. Erf, MC, U. S. Army Res.

Lowell A. Erf, Captain, Medical Corps, U. S. Army Reserve, died January 30 at the age of 47.

He received his medical degree from Ohio State University in 1931. At the time of his death he was Assistant Professor of Medicine, Assistant Director of the Charlotte Drake Cardeza Foundation and Director of the Plasma-Transfusion Unit of The Jefferson Medical College and Hospital, Philadelphia.

Dr. Erf was one of the pioneers in Nuclear Medicine. He contributed over 200 papers to medical literature, and was known as an outstanding diagnostician. He was an authority in the field of hematology. He was a member of the American Medical Association, The Harvey Society of Hematology, New York Blood Society, and Association of Military Surgeons. He was a Fellow of the American College of Physicians.

He is survived by his wife who resides in Philadelphia.

Lt. John D. Wonder, A.U.S.

John D. Wonder, Lieutenant, A.U.S., died at Dayton, Ohio, March 2 at the age of 75.

Dr. Wonder was born at Dayton, Ohio, and spent most of his life there. He graduated from Pulte Medical College at Cincinnati in 1905. That institution was later taken over by Ohio State University. During World War I he served in the Army Medical Corps as a first lieutenant.

He was a member of the American Medical Association, the Radiological Association of North America, and the Association of Military Surgeons (1918). For many years his practice was limited to gastro-enterology.

Dr. Wonder is survived by his wife, Mrs. Helen Wonder, 245 Four Mills Ave., Oakwood, Dayton 9, Ohio.

LCDR E. L. Merritt, U. S. Navy Res., Ret.

E. Lester Merritt, Lieutenant Commander, U. S. Navy, Reserve, Retired, died May 4 at Falls River, Mass., at the age of 62.

Dr. Merritt was a native of Massachusetts. He received his medical degree from Tufts College Medical School in 1917, and then served his internship at the Naval Hospital at Newport. He was actively engaged in medical, civil, and military affairs. He first enrolled in the Medical Corps of the Reserves in 1917, and served on active duty in both World Wars. He retired from active duty with the Navy and has been on the honorary retired list of the Naval Reserve.

He is survived by his wife and three daughters.

Col. F. P. Reynolds, U. S. Army, Ret.

Frederick Pratt Reynolds, Colonel, U.S. Army, Retired, died at New York City on May 18 at the age of 88 years.

Colonel Reynolds was a native of New York. He received his medical degree from the University of Pennsylvania in 1890, and entered the Army in 1892. He served a number of years in the Office of the Surgeon General of the Army. During World War I Colonel Reynolds was awarded the Distinguished Service Medal for his outstanding service as surgeon of the advanced section, Services of Supply, American Expeditionary Forces. He retired from the Army in 1923

at his own request after more than thirty years' service.

Colonel Reynolds contributed a number of articles to the official journal of this Association during his early military career. One article in 1902 won him Honorable Mention for the Enno Sanders Prize which was given in those days, and which carried with it life membership in this Association.

Colonel Reynolds is survived by his widow, Mrs. Hortense C. Reynolds; two sons, Frederick P. Reynolds, Jr., and Dr. Stephen Reynolds; three brothers, Maj. General Charles R. Reynolds, U. S. Army, Ret. (former Surgeon General), Brig. General Royal Reynolds, U. S. Army, Ret., and Mr. Robert Reynolds; four grand-children, and two great-grandchildren.

BOOK REVIEWS

PRACTICE IN RADIOTHERAPY. Under the General Editorship of Sir Ernest Rock Carling, LL.D., F.R.C.S., F.R.C.P., F.F.R., Consulting Chairman, International Commission on Radiological Protection; B. W. Windeyer, M.B., B.S., D.Sc., F.R.C.S., F.R.A.C.S., F.F.R., Professor of Radiology, University of London; and D. W. Smithers, M.D., F.R.C.P., F.F.R., Professor of Radiotherapy, University of London. 516 pages, illustrated. C. V. Mosby Company, St. Louis. 1955. Price $20.00.

As stated in the introduction "this book is designed to expand the presentation of a specialized subject and to provide a picture of radiotherapy practice today." This the book does remarkably well certainly as far as radiotherapy as practiced in Great Britain is concerned. The format is well planned and the authors of the many chapters and sections have achieved the editors' purpose in that they have presented a general view rather than expressed too strongly their own individual preferences.

It would be difficult to select a more outstanding group of authoritative writers than the editors have done. At the editors' suggestion the authors have used as collaborators others of their clinical colleagues. This has added immeasurably to the value of this volume and illustrates well the growing effort of recent years at cooperation between the radiotherapist and his surgical and medical colleagues in order to offer the patient the best in medical care.

The volume is divided into two parts. Part I covers the general problems in radiotherapy such as dosage and measurements; biophysical basis and the clinical basis for choice of treatment as well as all methods of radio therapy. Safety and protection are well covered as is the use of radiography in treatment. Part II takes up the treatment of malignancies of various organs each covered in a separate chapter by specialists, both clinical and radiological in that particular field. A special chapter is given to the malignant diseases of childhood. A chapter is devoted to radiotherapy of some non-malignant conditions.

Each chapter follows the general form of introduction, pathology, preferred methods of treatment, the philosophy of treatment, and a discussion of complications and results. Statistical results are presented without bias. Each chapter is well illustrated and references are abundant. The book is well indexed.

This volume is a very welcome addition in the field of radiotherapy and should be as valuable to the surgeon and internist whose practice includes the treatment of malignant disease. For the student and resident in Radiology it will be invaluable. As a reference it should be in every medical library. The authors as well as the editors are to be warmly congratulated on achieving so notably their purpose both as to scope and presentation.

COL. J. A. ISHERWOOD, MC, USA

CHEMISTRY AND HUMAN HEALTH. By Burnham S. Walker, M.D., Ph.D., Professor of Biochemistry, Boston University School of Medicine; Isaac Asimov, Ph.D., Associate Professor of Biochemistry, Boston University School of Medicine; and M. Kolaya Nicholas, R.N., M.A., Instructor in Chemistry and Pharmacology, Medical Center, Jersey City Hospital School of Nursing. 445 pages, Blakiston Division, McGraw-Hill Book Co., Inc., New York, Toronto, London, 1956. Price $5.75.

This text, written primarily for student nurses, is one of the most outstanding texts on Chemistry the reviewer has read. It is written in a style that is attractive, logical and easily pursued.

There are fourteen chapters which take the student progressively through inorganic, organic and bio-chemistry. The summaries and questions at the ends of these topics are stimulating in that they are not just repetitions of what has been said, but they provoke the logical thinking of the student before the questions can be answered. The presentation of such complex matters as the periodic table, ionization and oxidation-reduction, is simple and comprehensible because of references to common understandable phenomena. The references throughout the text as to how the information applies to medicine is refreshing in a Chemistry text book.

The authors are to be congratulated on writing a book that should not only prove to be an excellent Chemistry text book for student nurses, but a good review for others concerned with medicine and human health.
CAPT. EMMA W. STAPLETON, ANC, USA

MICROBIOLOGY WITH APPLICATIONS TO NURSING. 2nd Ed. By Catherine Jones Witton, M.A., Associate Professor of Biology, Simmons College, Boston, Mass. 620 pages, illustrated. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, Toronto, London. 1956. Price $6.50.

The new edition of this text, which was written for students of nursing, gives comprehensive, up-to-date coverage of basic microbiology which will be useful, not only to the student, but as a reference for all nurses—especially in the fields of Clinical Instruction, Public Health, Operating Room, Central Supply, Obstetrics and Pediatrics.

With the emphasis on disaster nursing and the treatment of mass casualties we must be prepared to modify many standard nursing methods. Since many of our methods are based on the fundamental concepts of bacterial morphology, which are so well presented in this text, we may use the book to advantage in guiding us safely when improvising or altering of standard practice becomes necessary.

The type, paper and binding are excellent. The many illustrations are clear, simple, and easily understood. References are recent and adequate. The study guides at the end of each chapter will help the student to coordinate the principles of microbiology with nursing experience and practice.
MAJ. PEGGY G. JONES, ANC, USA

CURRENT THERAPY 1956. Latest Approved Methods of Treatment for the Practicing Physician. Edited by Howard F. Conn, M.D. 632 pages. W. B. Saunders Company, Philadelphia & London. 1956. Price $11.00.

This book is a remarkable compilation of current thinking on modern therapy, equivalent to the refined distillate of some 282 contributors, each of whom is a recognized expert in his field. Thus, the authors represent a cross section of "Who's Who" in modern medicine and surgery and the ancillary specialties.

This compendium is divided into 15 sections devoted respectively to infectious diseases, the respiratory, hemapoetic, digestive and endocrine systems, metabolism and nutrition, the urogenital tract, venereal and allergic diseases, obstetric and gynecologic conditions, diseases of the skin, of the nervous and locomotor systems and the therapy of diseases due to physical and chemical agents. The sixteenth section is composed of appendices and indices together with a roster of some 250 modern drugs whose therapeutic efficacy has been established.

In his preface, the editor, Dr. Howard F. Conn of Houston, Texas, states that this is the eighth edition designed primarily for the busy practitioner. By means of annual rotation of authors, "new blood" transfuses the context in the form of modern methods, new ideas, and fresh approaches to time-honored problems in therapeusis. This procedure produces essentially a new book each year rather than a revision of former editions. Important concepts are correlated with standard principles of pathology. Complementing the many practical virtues of this symposium on *Current Therapy 1956* are the absence of exhaustive bibliographies and the omission of contradictory experimental evidence of doubtful clinical application.

This book is a "must" for all physicians and medical officers faced with the constant problem of keeping abreast of the rapid advances on many fronts in the "forced march" of modern medicine.
CAPT. CHRISTOPHER C. SHAW, MC, USN

HANDBOOK OF TOXICOLOGY. Vol. I. Acute Toxicities of Solids, Liquids and Gases to Laboratory Animals. Edited by William S. Spector. 408 pages. W. B. Saunders Co., Philadelphia and London. 1956. Price $7.00.

Under the directorship of Dr. von Oettingen, Chief Toxicologist, NIH, and with the aid of 28 associates in government and university circles, or in industrial laboratories, a very comprehensive study has been made of the literature dealing with acute toxicity of various substances for several species of commonly used laboratory animals, following oral, parenteral or inhalational administration. Every effort was made to check the accuracy of the values reported. Citations to literature are given throughout, permitting more extensive search if desired. The original data have been converted, in a few instances, into cc or mg/kg for uniformity of presentation. In addition to the recognized chemical names for the 2120 products incorporated in Table I, synonyms are given in the 42-page index. A total of 228 abbreviations are given in the bibliography,

although other references are included in the text. For each product, the animal, route of administration and dose (MLD,LD, or LD_{50} or LD_{100}) are recorded. The dosage value selected is reported, wherever possible, as mg/kg. Where data were found on other methods of administration, they were also included. The range of dosage, from which the single value was selected is indicated; the vehicle or solvent, and the reported time of death.

It was not possible to record many variables influencing the chosen range. When possible, range data were determined which should include 95% of the test animals. If the data permitted, the standard deviation of the selected value was reported. Reference is made to the tabulation of toxicity classes proposed by Hodge and Sterner, as a basis for estimating lethal doses for man.

Table II records the lethal concentrations of 243 products in respired air. The concentrations are reported as mg/liter, and also as parts per million, with regard to definite time of exposure and interval to death.

It is obvious that a great deal of work is summarized in a very short space in this book. Volume II is scheduled to appear in 1956 and will be very helpful, in supplementing the information in this most valuable reference work. It will deal with antibiotic, anthelmintic and antimalarial compounds, carcinogens and metabolites of toxic compounds. Volume III will deal with insecticides, fungicides and rodenticides. Volume IV will include toxic and venomous animals, plants and alkaloids. Finally, Volume V will deal with water pollutants, chronic toxicity, industrial and radiation toxicology and the MAC (Maximum Allowable Concentration) of toxic substances in air.

This will be a most valuable series of reference books and the data given therein will lead to a great deal more controlled research to iron out some of the discrepancies, and to extend information to other species of laboratory animals. It would seem wise to place a standing order for all of these volumes.

JAMES C. MUNCH

THE AMERICAN DRUG INDEX. By Charles O. Wilson, Ph.D., Professor of Pharmaceutical Chemistry, College of Pharmacy, University of Texas; and Tony Everett Jones, M.S., Instructor of Pharmaceutical Chemistry, College of Pharmacy, University of Colorado. 576 pages. J. B. Lippincott Company, Philadelphia and Montreal. 1956. Price $5.00.

Here is a book that is needed by any person dealing with medicines, from the prescribing to the dispensing.

In the first paragraph of the Preface the authors state, *"The American Drug Index* has been prepared for the identification and correlation of the many pharmaceuticals available to the medical and allied professions. The need for this index has become acute as the number of drugs and drug products in all their tremendous variety has multiplied."

The authors have set out to index practically every preparation now on the market and to group like preparations. All of this information has been cross indexed. This monumental task has been magnificently done. The 576 pages are crowded with information on drugs in an easily available form. Since they are listed alphabetically no index is necessary.

The authors are to be congratulated on the completeness of this work.

COL. ROBERT E. BITNER, USA, RET.

EXCITABILITE NEURO-MUSCULAIRE ET EQUILIBRE IONIQUE. (French) By H. Laborit, Surgeon Marine Hospital; and Mme G. Laborit. 108 pages, illustrated. Masson et Cie, Paris. 1935. Price 880 Fr.

The authors of this 107 page monograph, a general surgeon and an anesthesiologist, believe that experimentation in neuromuscular excitability is a feasible method for the study of tissue function, when that function is considered in the light of the permeability of the cell membrane and its reactions to (1) the ambient fluid and its special contents and (2) the cell itself with its special contents depending upon the state of disease or normalcy. They stress the point that the *entire* organism is to be studied, rather than isolated organs, if such information is to be applied to human pathology.

The physiologic effect on membrane permeability (and therefore tissue function) of K, Na, Ca, Mg, heat, light, radioactive substances, electricity, adrenalin, insulin, nerve section, and other pharmacologic factors are discussed at length, sometimes with opinion conflicting with that of previous and time-honored investigations. The authors are particularly concerned with the effects of these agents on the patient so far as the results of surgery and anesthesia (with or without hypothermia technique) may be experienced, and the role they play in such conditions as pulmonary edema and drug poisoning (curare, strychnine, etc.).

Using 50 patients for their studies, determining before, during and after surgery the blood levels of K, Ca, Na and protein, hematocrit, alkaline reserve, red and white cell count, content and structure, plasma density, and other factors, the authors employed a specially constructed electronic rheotome, taking readings for neuromuscular excitability from a particular motor point on the lower leg. They found, for example, as a result of altered K content of the cell, that with the use of a neuroplegic drug such as chlorpromazine in the hypothermic state, that there was a *hyper*excitability of skeletal muscle. While they have not yet established enough data to state "rules" or "laws," they believe that if, before surgery, a patient shows a hypoactive neuromuscular excitability (though he otherwise may appear physiologically normal), he may be expected to show operative or post-operative difficulty. In their studies they have come to the conclusion that abnormal degrees of neuromuscular excitability are almost always present in the diseased state, that a detection of this condition (probably due to abnormal passage of K through the cell membrane) can be used as a pre-operative warning, and that, when present, its danger can be minimized by the use of hypothermia and special pre- and post-operative "ionic" therapy.

COL. JOHN MARTIN, USA RET.

OBSTETRIC PRACTICE—In Series of Handbooks for the General Practitioner. By Harold Speert, M.D., Associate in Obstetrics and Gynecology, Columbia University College of Physicians and Surgeons; and Alan F. Guttmacher, M.D., Director of Obstetrics and Gynecology, the Mount Sinai Hospital. 478 pages. Blakiston Division, McGraw-Hill Book Company, New York. 1956. Price $7.00.

"Obstetric Practice" is the fourth volume in a series of Handbooks for the General Practitioner. The aim of the authors is to provide a practical up to date guide to assist the physician in the actual care of his obstetrical patients. Purposely omitted are basic subjects such as the anatomy and physiology of the reproductive organs, fetal development, and theoretical discussions.

Emphasis is given to the use of surgery, medicine and therapeutics in the solving of obstetrical problems.

Of interest to the reader, who does not wish to make a detailed study of the subject matter, this Handbook will be of particular value. Recent advances made in diagnosis and treatment of such subjects as neurological disorders of pregnancy, spontaneous abortions and fetal death in utero, toxemia of pregnancy and ectopic pregnancy are very well presented.

For the purpose which "Obstetric Practice" was intended, as a handbook for the General Practitioner, this volume is recommended.

COL. JOHN W. DARROUGH, MC, USAR

UROLOGY. By B. G. Clarke, M.S., M.D., F.A.C.S., Associate Professor of Urology, Tufts University School of Medicine; and Louis R. M. Del Guercio, M.D., Assistant Resident Surgeon, St. Vincent's Hospital, New York. 245 pages, 162 figures. The Blakiston Division, McGraw-Hill Book Company, Inc., New York, Toronto, London. 1956. Price $6.50.

This book briefly presents the subject matter of the specialty of urology and provides a selected list of references to key books and articles in readily available arrangement. It provides a short essential text, brief enough to be read during an undergraduate course in urology or to be used for review.

The reading is made easy by using diagrams and pictures appropriately placed in the written description.

Part I presents the diagnosis of genitourinary diseases. Rarely has this subject been treated so concisely, logically and thoroughly. Emphasis is placed on history-taking and physical examination. The laboratory and x-ray diagnosis is accurately described in every phase.

Part II, physiologic disturbance, brings up to date the recent advances in basic science and physiology of the nephron, neurogenic dysfunction and male infertility.

Part III deals concisely and logically with the principles of treatment.

Throughout the text the principles of urology expressed are concise, clear and basically sound. Rarely is so much material assembled in such brief, concise and thorough form.

This is a valuable text for residents in urology and as a review for the advanced student in this specialty.

COL. JAMES C. KIMBROUGH, USA, RET.

NEW BOOKS

Selected Papers of Joseph W. Mountain, M.D. The American Public Health Association, New York, N.Y. Price $5.00.

Thoracic Surgery for Physiotherapists, by Gladys M. Storey, J. B. Lippincott Co., Philadelphia, Pa. Price $3.00 (U.S. Market Only).

Design and Construction of Removable Orthodontic Appliances, by Adams. The Williams & Wilkins Co., Baltimore, Md. Price $4.50.

Pharmacological and Chemical Synonyms. Excerpta Medica Foundation, Amsterdam The Netherlands. Price $3.50.

Management of Strokes, by Keith W. Sheldon, M.D. J. B. Lippincott Co., Philadelphia, Pa. Price $3.00.

Paratrooper, by Lt. Cols. Francis X. Bradley and H. Glen Wood. The Military Service Publishing Co., Harrisburg, Pa. Price $3.50.

Medical Parasitology, by William G. Sawitz, M.D. The Blakiston Division, McGraw-Hill Book Co., Inc. New York, N.Y. Price $6.00.

Handbook of Physical Therapy, by Robert Shestack, PH.G.R.P., P.T.R. Springer Publishing Co., Inc. New York, N.Y. Price $4.25.

The Office Assistant in Medical or Dental Practice, by Portia M. Frederick and Carol Towner, W. B. Saunders Co., Philadelphia, Pa. Price $4.75.

The Management of Menstrual Disorders, by C. Frederick Fluhmann, B.A., M.D., C.M. W. B. Saunders Co., Philadelphia, Pa. Price $8.50.

Basic Facts of General Chemistry, by Brooks. W. B. Saunders Co., Philadelphia, Pa. Price $4.75.

Nursing Pathology, by Goodale, 2d ed. W. B. Saunders Co., Philadelphia, Pa. Price $4.50.

New and Nonofficial Remedies 1956. J. B. Lippincott Co., Philadelphia, Pa. Price $3.35.

Bing's Local Diagnosis in Neurological Diseases. Translated, Revised, and Enlarged by Webb Maymaker, M.D. The C. V. Mosby Co., St. Louis, Mo., Price $16.75.

Gynecologic Cancer, by James A. Corscaden, PH.B., M.D., 2d ed. The Williams & Wilkins Co., Baltimore, Md. Price $10.00.

Histamine, Ciba Foundation Symposium, edited by G. E. W. Wolstenholme and Cecilia M. O'Connor. Little, Brown & Co., Boston, Mass. Price $9.00.

Diseases of the Skin, by Richard L. Sutton, Jr., A.M., M.D., F.R.S. (Edin.), 11th edition. The C. V. Mosby Co., St. Louis, Mo. Price $29.50.

Understanding Human Behavior, by James L. McCartney, M.D., F.A.C.P.F.A.P.A. Vantage Press, New York, N.Y. Price $3.50.

Virus Diseases and the Cardiovascular System, by Ernest Lyon, M.D. Grune & Stratton, New York and London. Price $5.75.

A Textbook of Operative Dentistry, by Wm. H. O. McGehee, D.D.S., Harry A. True, D.D.S., and E. Frank Inskipp, D.D.S. McGraw-Hill Book Co., Inc., New York, N.Y. Price $14.00.

Veterinary Parasitology, by Geoffrey Lepage, M.D., M.Sc., M.A., M.Inst. Biol. Charles C Thomas, Publisher, Springfield, Ill. Price $12.75.

Mental Health Planning for Social Action by Geo. S. Stevenson, M.D., Sc.D. The Blakiston Div., McGraw-Hill Book Co., New York, N.Y. Price $6.50.

Cytology of the Blood and Blood-Forming Organs, by Marcel Bessis, translated by Eric Ponder. Grune & Stratton, Inc., New York, N.Y. Price $22.00.

Psychosomatic Aspects of Surgery, edited by Alfred J. Cantor, M.D. and Arthur N. Foxe, M.D. Grune & Stratton, Inc., New York, N.Y. Price $6.50.

Meditations of Medicine and Medical Education, Past and Present, by I. Snapper, Grune & Stratton, Inc., New York, N.Y. Price $3.75.

Any of the above books may be ordered through the Association of Military Surgeons. Check book desired, and return this page.

International Congress on Diseases of the Chest

August 19-23, 1956 at Cologne, Germany

August 20

Coronary Diseases of the Chest: J. Stamler, USA; W. Giese, Germany; N. Kimura, Japan; E. Gregg, USA; M. Holzmann, Switzerland; E. Wollheim, Germany; C. S. Beck, USA; H. E. Bolton, USA.

Industrial Diseases of the Chest: A. L. Banyai, USA; L. Dautrebande, Belgium; H. Valentin, Germany; Lopo de Carvalho, Portugal; E. W. Baader, Germany; T. Turiaf, France; G. S. Kilpatrick, England; R. H. Goetz, South Africa.

August 21

Virulence and Resistance under Chemotherapy of Pulmonary-Tuberculosis: J. Hirsch, Switzerland; G. Meissner, Germany; L. Heilmeyer, Germany; E. Bernard, France; G. Domagk, Germany; H. Rink, Germany; A. Omodei Zorini, Italy; J. A. Myers, USA; H. Wurm, Germany.

August 22

Pulmonary Function: S. Björkman, Sweden; W. G. Zijlstra, Holland; P. Sadoul, France; Ch. Fletcher, England; R. Vaccarezza, Argentina; W. Bolt, Germany; C. W. Hertz, Germany.

Cardiac Function: R. G. Kourilsky, France; A. de la Fuente Chaos, Spain; O. Garcia-Rosell, Peru; M. S. Mazel, USA; H. Reindell, Germany; B. L. Gordon, USA; J. Jacobi, Germany; H. W. Knipping, Germany; K. Wezler, Germany.

August 23

Tumors of the Mediastinum: A. Caralps, Spain; H. Krauss, Germany; E. Uehlinger, Switzerland; M. Loeweneck, Germany; M. J. Bariety, France; R. H. Overholt, USA; H. Venrath, Germany.

Panel-Discussions: Names of the speakers in the definitive program.

Languages: English, French, Spanish, German. Simultaneous translation. *For information:* Sekretariat des IV. Internationalen Kongresses "American College of Chest Physicians," Köln-Deutz, Messeplatz (Germany).

INFORMATION FOR AUTHORS

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POLIOMYELITIS

Dr. Leonard A. Scheele, Surgeon General of the United States Public Health Service, has urged an expanding program for poliomyelitis immunization. The reduction in poliomyelitis this year is encouraging and the increasing availability of the vaccine makes an expanding program possible.

According to Dr. Jonas E. Salk, children protected against paralytic polio through the full schedule of vaccine shots will carry immunity for at least three years.

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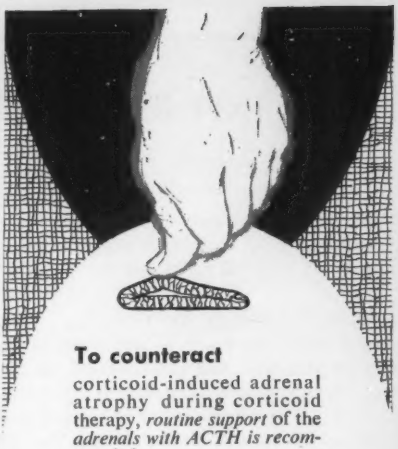

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- When using *cortisone:* for every 400 mg. given, inject approximately 100 units of HP*ACTHAR *Gel.*

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